Protected Bikeway Feasibility Analysis

Prepared for the City of Minneapolis by Alliant Engineering, Inc.

Final Report — March 4th, 2015

1. Introduction

The City of Minneapolis is preparing an update to the 2011 Minneapolis Bicycle Master Plan. The current plan addresses a broad range of bikeway facility types, including off-street trails, bike boulevards, bike lanes, and shared lanes, but it does not specifically address on-street protected bikeways. The City of Minneapolis also approved a Climate Action Plan in 2013 recommending the implementation of 30 miles of on-street protected bike facilities by 2020. The Bicycle Master Plan update will identify priority locations, capital costs and maintenance costs for the implementation of protected bikeways in Minneapolis. This document has investigated the feasibility of installing protected bikeways on 19 corridors, shown in Figure 1-1. The evaluation will provide supporting information and preliminary concepts for the Bicycle Master Plan update.

Protected Bikeway

A protected bikeway is a bicycle facility that is physically separated from motor vehicle traffic. Off-street trails are the most common type of protected bikeway; however, protected bikeways may also be located within street corridors and separated from traffic lanes through parked cars, curbs, medians, bollards/flexible traffic posts, planters or other vertical feature.

Photo: Two-Way Protected Bikeway on 36th St W, Minneapolis (2014)

The bicycle network has been expanded significantly in recent years, and a lot of people are biking. However, not everyone feels comfortable and safe riding on a busy street, even with a bike lane. There are some parts of the city where potential bicycling demand is high, but where low-stress bikeway facilities such as trails, bike boulevards, and lower-traffic streets aren't an option. Protected bikeways are designed to feel comfortable and accommodate all bicycle rider types.

Feasibility Analysis

This report provides a summary of the development and methodology to arrive at potential concepts for each corridor. The goal of this report is not to identify a final recommended design, or details of the design; rather, to determine feasibility of implementing a protected bikeway, design considerations, impacts and where feasible, determine a preliminary concept for each corridor. Every corridor is located within a constrained environment. Therefore, changes to rebalance the transportation mode or to generate additional bike lane width may require street use trade-offs or major reconstruction. As noted, protected bikeways separate the bike lane from the adjacent traffic lane. In general, the feasibility analysis and preliminary concepts identified represent a retrofit of the existing roadway where transportation system trade-offs are required to accommodate an on-street protected bikeway. In a few locations, an off-street facility has been identified. The preliminary concepts for the 19 corridors are illustrated in Figures A-1 through A-19.

Study Process

The feasibility analysis include the following key components:

- **Technical Advisory Committee (TAC):** The TAC consisted of City of Minneapolis, Hennepin County, and Alliant Engineering staff. Weekly meetings were held throughout the alternatives analysis process to discuss each corridor in detail. The purpose of the meetings was to form a consensus on protected bikeway design parameters, to gain background information, review future plans, discuss feasibility, review conceptual cross-sections, and detail potential impacts for protected bikeways on each of the 19 corridors.
- **Documentation of Existing Conditions:** The existing conditions for each corridor was documented by completing a thorough field review and investigating current aerials, planimetric files, and as-built plans that were provided by the City. Criteria that was documented included existing street width, travel lane width, sidewalk width, lane assignments, presence of bike facilities, parking characteristics, transit services, curb and gutter characteristics, and other elements.
- **Develop Conceptual Cross-Sections and Intersection Improvements:** A range of typical cross-section alternatives for protected bikeway implementation for each corridor was developed. The cross-sections evaluated transportation and street use trade-offs needed to accommodate a protected bikeway. These include:
    - Lane widths and/or parking widths
    - Presence of parking
    - Number of vehicle travel lanes
    - Sidewalk, median and/or boulevard widths
    - Curb and gutter characteristics
    - Transit Services
- **High Level Impact Analyses:** For alternatives where eliminating a travel lane was considered, a high level traffic operations analysis was conducted using the existing AM and PM peak hours traffic volumes and signal timing parameters to understand lane removal impacts to traffic operations. The intersection delay was documented, along with an assessment of the impact of removing a travel lane. The analysis was used as a gauge to determine if further analysis was required.
- **Estimate Capital Costs for Each Corridor:** Planning level capital costs for construction were developed for each preliminary concept.

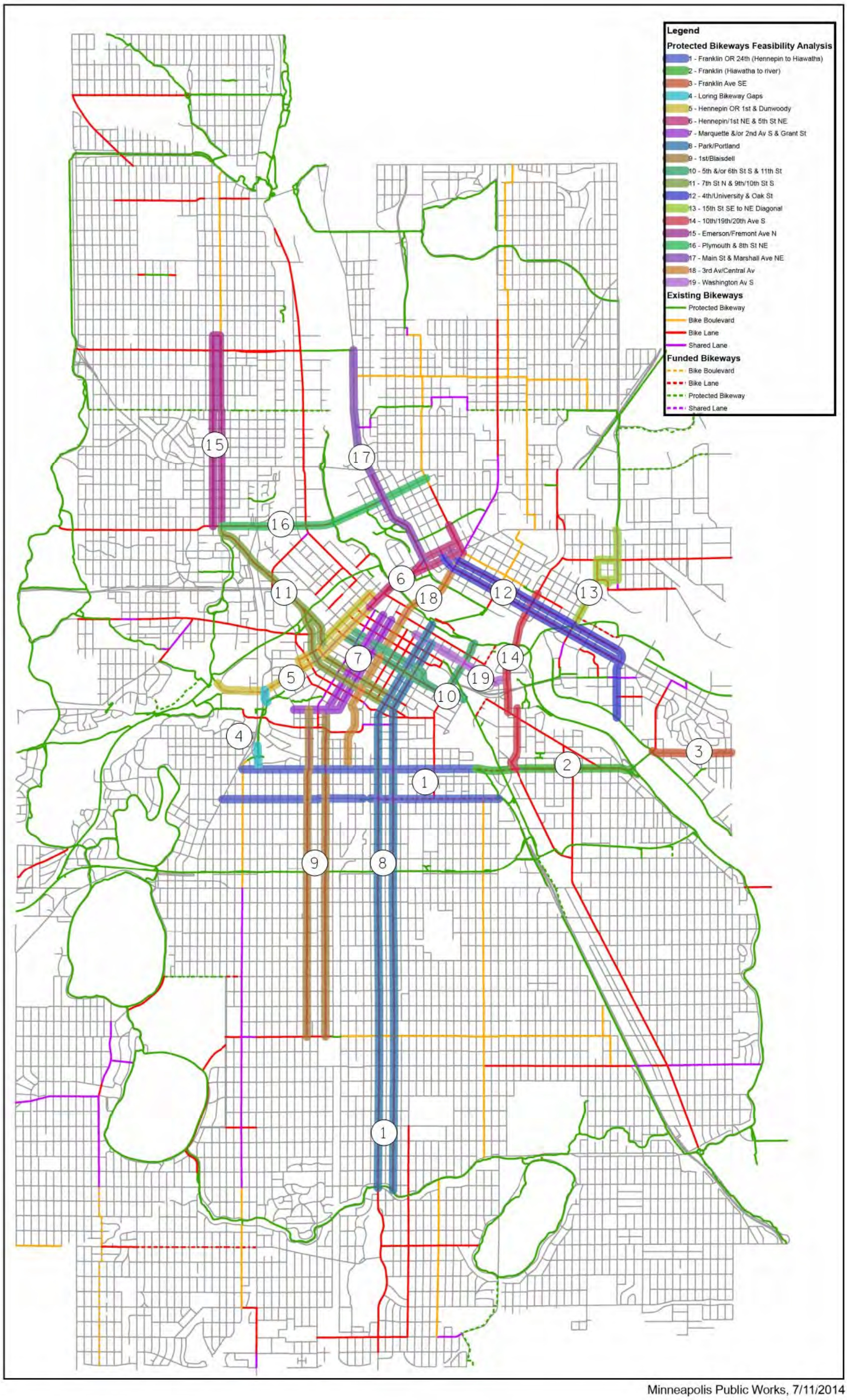


Figure 1-1. Study Corridors

2. Corridor Evaluation

The objective of the analysis is to provide a high-level evaluation of the feasibility of protected bikeways on 19 corridors in the City of Minneapolis. The study process involved breaking down each corridor into similar segments, developing cross-section alternatives for each segment, detailing the transportation system trade-offs for providing a protected bikeway, and performing an operations analysis on segments where the removal a vehicle travel lane was an option. The following text describes more in depth the evaluation process that was used to form the preliminary concepts.

Corridor Breakdown

Each corridor was segmented based on street widths, parking characteristics; and sections with similar features. For each segment, the street width, daily traffic and bicycle volumes, parking, and State Aid route classification were documented, as well as land use context and connections with the surrounding network. Based on each segment's characteristics, different cross-section options to create dedicated space for a protected bike facility was explored.

Deign Parameters

The protected bikeway design guidelines for one-way, two-way and raised facilities are documented in the NACTO (National Association of City Transportation Officials) Urban Bikeway Design Guidelines as illustrated in Figure 2-1. Based on limited experience from Minneapolis and Hennepin County the ideal geometric parameters for the protected bikeway designs include a 3-foot buffer lane and a 7-foot one-way bike lane (or 10-foot two-way bike lane). In some instances these parameters were not feasible for retrofit conditions and are noted on the preliminary concepts.

Where applicable, Minnesota State Aid standards are considered for vehicle, parking and bicycle lane widths. Every effort is made to meet these design standards. Where this is not possible, or parking or vehicle lane trade-offs cannot be made, a protected bikeway may not be feasible. However, in some cases a design exception could be investigated. Segments requiring a design exception are denoted.

Special consideration was given to segments where there was a 2-foot gutter pan/bituminous seam along with narrow bike lanes. This situation can be uncomfortable or hazardous for bicyclists. In some cases integrant concrete curb may be required. Specifically, the need for integrant curb was identified for two cases. First, is the case of a one-way protected bike facility with a 5-foot bike lane width or less, which also includes the two-foot concrete gutter. In this case, a 5-foot integrant curb is needed to provide a seamless facility for bicyclists. Second is the case of a two-way protected bike facility where the combined two-way bike lane width was 8-feet or less. In this case an integrant curb was assumed at the width of the two-way bike lanes plus the buffer width.

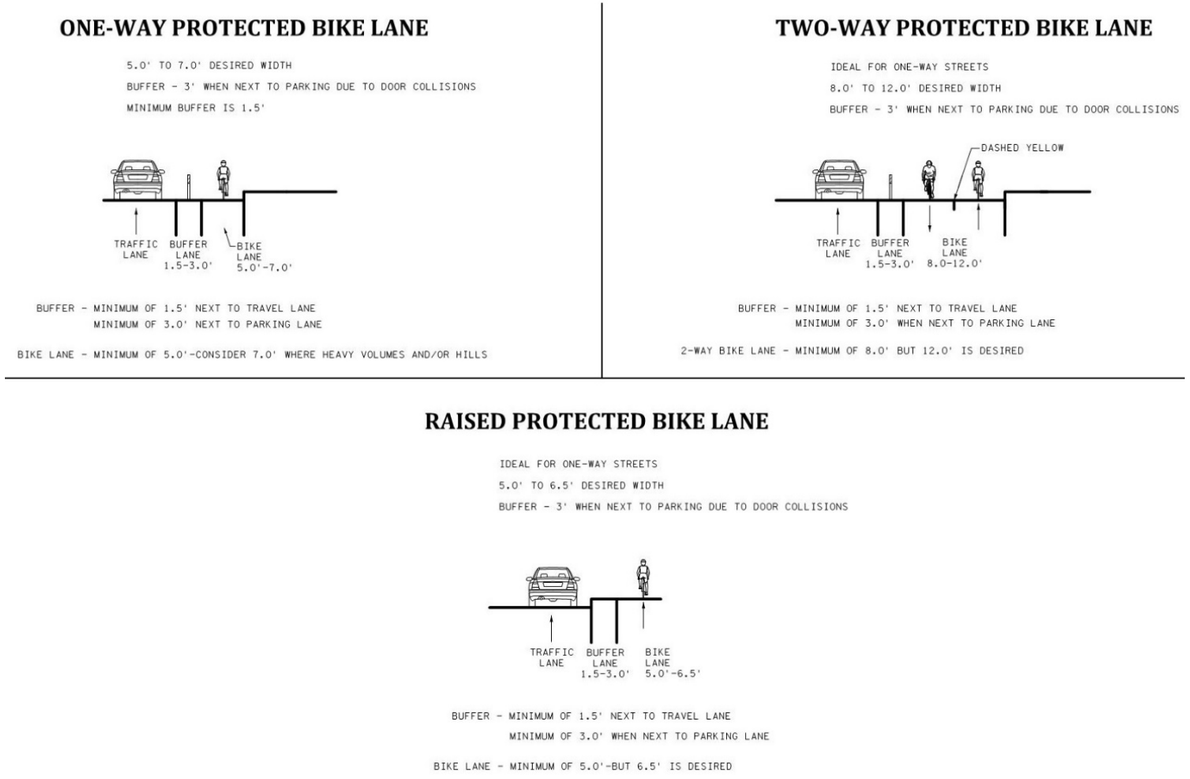


Figure 2-1: Protected Bike Lane Best Practice Design (NACTO Guidelines)

Traffic Operations Analysis

For segments with cross-section alternatives where a reduction in the number of vehicle lanes was recommended, a high level traffic operations analysis was performed. Using the industry current SYNCHRO/SIMTRAFFIC software package, approach delays were estimated and evaluated in context of the overall corridor operation and other factors (e.g., bus stop location, bus frequency and pedestrian activity). Based on this analysis, an assessment of the level of congestion was made to determine whether or not the removal of a travel lane is feasible, manageable or if alternative options require further consideration. It is noted that this was a very high level analysis and a more detailed analysis, where applicable, should be completed with preliminary engineering design.

Preliminary Cross-Section Selection

The project team worked closely with City and County staff to develop a selection of potential cross-sections for each segment on each of the 19 corridors. The cross-sections show various strategies to incorporate protected bikeways while detailing the transportation space trade-offs. The cross-section alternatives for each corridor were reviewed and discussed at meetings with the City and County. Ultimately, the cross-sections were narrowed down to one preliminary cross-section for most segments as illustrated in Figure A-1 through Figure A-19. In several cases, there are corridor segments identified as requiring further evaluation or where the implementation of a protected bikeway is not feasible.

Within each segment, there are variations to certain cross-sections that show how they could be modified to accommodate safety and mobility for all transportation modes. These variations include:

- Intersection treatments:
  - Signal improvements, re-alignment, turn lane or travel lane removal
- Travel lane, parking and bicycle-related treatments:
  - Lane width reductions, travel lane reduction, turn lane creation, and/or lane for bicycle travel
  - On-street parking on one side, both sides, and/or removed
  - Designated bike facilities: Bike Boulevards/sharrows/bike lanes (regular, buffered, or protected)

While each cross-section is tailored to a specific segment, it is feasible that certain cross-sections may apply in more than one segment, which should be considered in the forthcoming stages of preliminary design.

3. Intersection Treatments

The feasibility analysis focused largely on the overall corridor bicycle type and typical street cross-sections. However, intersection treatments will need to be considered to make a protected bikeway comfortable and safe for all bicycle rider types. There are a number a strategies that can be employed at intersections to enhance safety and mobility of bicycle travel.

Signal Operation Treatments – The following signal revisions could be considered for protected bike lanes at signalized intersections:

- **Leading Bike/Pedestrian Phasing –** Providing a leading bicycle or pedestrian phase gives priority and enables the bicyclist/pedestrian to establish a presence at an intersection.
- **Dedicated Bike Phase –** A dedicated bike phase is indicated by bike signal heads and provides a dedicated signal phase for bikes only, separating them from conflicting motor vehicle, LRT, and/or pedestrian movements.
- **Bicycle Detection –** Providing bicycle detection at actuated signals to alert the controller of a bike demand. Detection can be provided via a push-button or automated means.

Pavement Marking Treatments – The following pavement marking and signage elements could be considered for protected bike lanes at intersections:

- **Bike Boxes** – A bike box is a marked area (typically a green painted zone) ahead of vehicle traffic at a signalized intersection. The bike box allows bicycle traffic to get ahead of queued vehicle traffic when the light turns green and increases visibility.
- **Two-Stage Turn Queue Boxes –** A two-stage turn queue box creates a safe route to get bicyclists from one side of the roadway to the opposite side to make a turn. This application basically creates a two-step safe crossing route to get to the desired side of the roadway through pavement markings and signage.
- **Intersection Conflict Zone Markings –** Pavement markings that provide a clear path for bicyclists and vehicle drivers through an intersection. The pavement markings raise awareness for both motorists and bicyclists to potential conflict areas.
- **Mixing Zones** – A mixing zone is an area where vehicle traffic merges into a bike lane by yielding to bike traffic to prepare for a turn. Mixing zones are generally characterized by dashed bike lane lines and/or specialize pavement markings to denote a shared area. For this study, the mixing zones are assumed at all unsignalized and signalized intersections.

Concrete Related Construction Treatments – The following construction elements could be considered for protected bike lanes:

- **Integrant Curb** – Integrant curb of varying widths has been assumed on many corridors. Integrant curb was assumed to eliminate the standard 2-foot gutter pan and, in turn, provide a seamless travel lane for bicyclists.
- **Curb Extensions** – A curb extension is constructed by increasing the sidewalk/curb area and narrowing the roadway. Curb extensions increase pedestrian safety by decreasing the crossing distance and making pedestrians more visible.
- **Medians/Refuge Islands –** A median or refuge island can be installed in the center of an approach leg at intersections to facilitate crossings of higher volume two-way streets. The median or refuge island allows bicycle or pedestrians to cross one direction at a time and provides a safe haven between traffic directions. The median or refuge island also acts a traffic calming measure for approaching vehicles as they slow down to navigate the in street obstacle.
- **Raised Barrier –** The provision of a raised barrier, as opposed to flexible delineator posts, may be advantageous at locations where additional separation is needed.

Detailed evaluation and identification of intersection treatments will be necessary during preliminary engineering of the corridors. The feasibility analysis identified key intersections that will require attention and in some cases evaluated possible bicycle treatments. For this study many intersection treatments were assumed and are detailed in the Preliminary Concept Figures and in the Cost Estimates. This section

highlights strategies that were assumed and additional treatments that should be considered during preliminary engineering design.

4. Capital Costs

A planning level capital cost estimate for each corridor was prepared based on the basic cross-section and corridor information detailed on each preliminary concept layout. Corridor specific construction elements such as integrant curb, medians, curb extensions, diverters, etc. were included were included in the estimates where noted. Additionally, annual maintenance costs provided by the city, were included for each corridor section. The following details the general cost assumptions for each category:

Pavement Marking & Signage

- Removal of all existing pavement markings.
- 12 inch painted markings (latex paint) were assumed for all buffered lanes or protected bikeway buffer hatching and all stop bar locations. Hatching spacing was assumed to be 25 feet.
- For the buffer zones, 6 inch solid white paint is assumed for the longitudinal striping next to vehicle traffic and 4" solid white paint is assumed for striping next to the bike lane.
- Bike message symbols in the bike lanes are assumed to be thermoplastic and spaced one per direction per block.
- All longitudinal pavement markings are assumed to be paint and all symbols are assumed to be thermoplastic material.
- Conflict zone markings (colored and dashed) are assumed in the intersection crossing of each unsignalized and signalized intersections.
- All crosswalks and stop bars are assumed to be remarked with latex paint.
- For a one-way and two-way protected bike lanes 5 sign assemblies per block, on average, are assumed (includes removal and new panels or panel relocations).
- Mobilization was assumed to be 5% of the total cost. Traffic Control was assumed to be 8% of the total cost.

Delineation

- Flexible delineator posts are assumed at an average 25 foot spacing. The total number of delineators was increased by 10 percent.

Signal Modifications

- Signal modifications are assumed at every signalized intersection to account for signal operation changes (phasing or added signal indications or countdown timers or bike phasing). In general, simple revisions were assumed at two-phased signals and more complex revisions were assumed at signals with left turn phasing.

Construction Elements

- For one-way protected bike lanes where there is a 2-foot gutter seam and the bike lane width is 5-feet or less, the section will be replaced with integrant curb.
- For two-way protected bike lanes where there is a 2-foot gutter seam and the two-way bike lane width is 8-feet or less, the section will be replaced with integrant to the outer edge of the buffer.
- Corridor specific construction elements such as off-street trails, medians and curb extensions were added to some corridors as denoted on the preliminary concept figures.

Other Costs

- Seal coating was assumed on all bituminous roadways where pavement markings are being removed. Concrete roadways would not be seal coated.
- 25% contingency was assumed for all corridors.

The capital construction costs are summarized in Table 1.

Table 1. Capital Cost and Corridor Summary

Section	Capital Costs				
	Signs, Pavement Markings & Delineators	Signals	Seal Coat	Construction Elements	Total Cost (Includes 25% Contingency)
1A - 24th St from Hennepin Ave to Hiawatha Ave	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
1B - Franklin Ave from Hennepin Ave to Bloomington Ave S	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
2A - Franklin Ave from Bloomington Ave S to 20th Ave S	$75,000	$35,000	$0	$20,000	**$163,000**
2B - Franklin Ave from 28th Ave S to Seabury Ave	$65,000	$20,000	$40,000	$20,000	**$182,000**
2C - Franklin Ave from 20th Ave S to 28th Ave S	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
3A - Franklin Ave SE from Thornton St SE to Emerald SE	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
4A - Lyndale Ave S from Franklin Ave to Loring Greenway Bridge	$105,000	$100,000	$0	$640,000	**$1,057,000**
4B - Lyndale Ave S from Oak Grove St to Dunwoody Blvd	$10,000	$0	$0	$35,000	**$57,000**
4C - Hennepin Ave from Oak Grove St to Maple St	$20,000	$5,000	$0	$0	**$32,000**
5A - Dunwoody Blvd Trail	$30,000	$5,000	$0	$215,000	**$313,000**
5B - Hennepin Ave from Maple St to 12th St N	$15,000	$0	$0	$0	**$19,000**
5C - 1st Ave from 12th St N to 1st Ave N	$120,000	$20,000	$75,000	$0	**$269,000**
5D - Hennepin Ave from Washington Ave to 1st Ave N	$40,000	$10,000	$30,000	$0	**$100,000**
5E - Hennepin Ave from 12th St N to Washington Ave	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
6A-Hennepin Ave/1st Ave NE from 1st St N to 5th St NE	$150,000	$60,000	$50,000	$250,000	**$638,000**
6B - 5th St NE from Hennepin Ave to 3rd Ave NE	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
7A - Grant St W from Willow St to Marquette Ave	$40,000	$10,000	$30,000	$30,000	**$138,000**
7B - Marquette Ave/2nd Ave S from 1st Ave S to Washington Ave	$230,000	$235,000	$45,000	$25,000	**$669,000**
8A - Park/Portland Ave from 46th St E to Franklin Ave E	$580,000	$115,000	$780,000	$0	**$1,844,000**
8B - Park/Portland Ave from Franklin Ave E to West River Pkwy	$290,000	$125,000	$310,000	$0	**$907,000**
8C - Park/Portland Ave from Minneahaha Pkway to 46th St E	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
9A-1st Ave S/Blaisdell Ave from 40th St E to Grant St W	$410,000	$260,000	$420,000	$30,000	**$1,400,000**
10A - 6th St S from Hennepin Ave to Park Ave & Trail from Park to Chicago	$95,000	$55,000	$90,000	$130,000	**$463,000**
10B - 11th Ave S from 6th St S to 2nd St S	$75,000	$20,000	$35,000	$0	**$163,000**
10C - 5th St S from 1st Ave N to Chicago Ave S	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
11A - 7th St N from Plymouth Ave N to 1st Ave N	$180,000	$70,000	$140,000	$0	**$488,000**
11B - 10th St S from 7th/10th Split to Park Ave	$155,000	$85,000	$95,000	$0	**$419,000**
11C - 9 St S from 1st Ave to Park Ave	$115,000	$60,000	$105,000	$0	**$350,000**
12A - University Ave SE from 1st Ave NE to Oak St SE	$225,000	$80,000	$190,000	$240,000	**$919,000**
12B - Oak St SE from E River Pkwy to Washington Ave SE	$35,000	$10,000	$40,000	$0	**$107,000**
12C - Oak St SE from Washington Ave SE to Walnut St	$60,000	$25,000	$35,000	$180,000	**$375,000**
12D - 4th St SE from 1st Ave NE to Walnut St	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
13A - 15th Ave SE from University Ave to Rollins Ave SE	$105,000	$65,000	$45,000	$125,000	**$425,000**
13B - Rollins Ave SE/18th Ave SE from 15th Ave SE to Como Ave SE	$25,000	$0	$10,000	$85,000	**$150,000**
13C - 18th Ave SE from Como Ave SE to E Hennepin Ave	$35,000	$10,000	$25,000	$0	**$88,000**
13D - 15th Ave SE/Como Ave SE from Rollins Ave SE to 18th Ave SE	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
14A - 20th Ave S from Minnehaha Ave to Riverside Ave	$70,000	$10,000	$40,000	$20,000	**$175,000**
14B - 19th Ave S/10th Ave S from Riverside Ave to 5th St SE	$125,000	$60,000	$65,000	$0	**$313,000**
15A-Emerson Ave N from Plymouth Ave N to 33rd Ave N (Cost Out as a TWPBL)	$140,000	$40,000	$135,000	$0	**$394,000**
15B-Emerson/Fremont Ave N from Plymouth Ave N to 33rd Ave N (Cost Out as a OWPBL PAIR)	$215,000	$75,000	$255,000	$0	**$682,000**
16A-Plymouth Ave N/8th Ave NE from Fremont Ave N to 5th St NE	$255,000	$65,000	$135,000	$0	**$569,000**
17A-Main St/Marshall St NE from Hennepin Ave to 14th Ave NE	$130,000	$40,000	$135,000	$0	**$382,000**
17B-Marshall St NE from 14th Ave NE to Lowry Ave NE	$70,000	$10,000	$90,000	$0	**$213,000**
18A-3rd Ave from Washington Ave S to 5th St NE	$160,000	$65,000	$75,000	$0	**$375,000**
18B - 3rd Ave from E Franklin Ave to Washington Ave S	NA[1]	NA[1]	NA[1]	NA[1]	**NA[1]**
19A-Washigton Ave	$195,000	$60,000	$165,000	$0	**$525,000**

[1.] Costs were not calculated for these segments as no construction work is proposed. If the segment is an existing facility, it will remain as such or a future bike facility type is not yet determined.

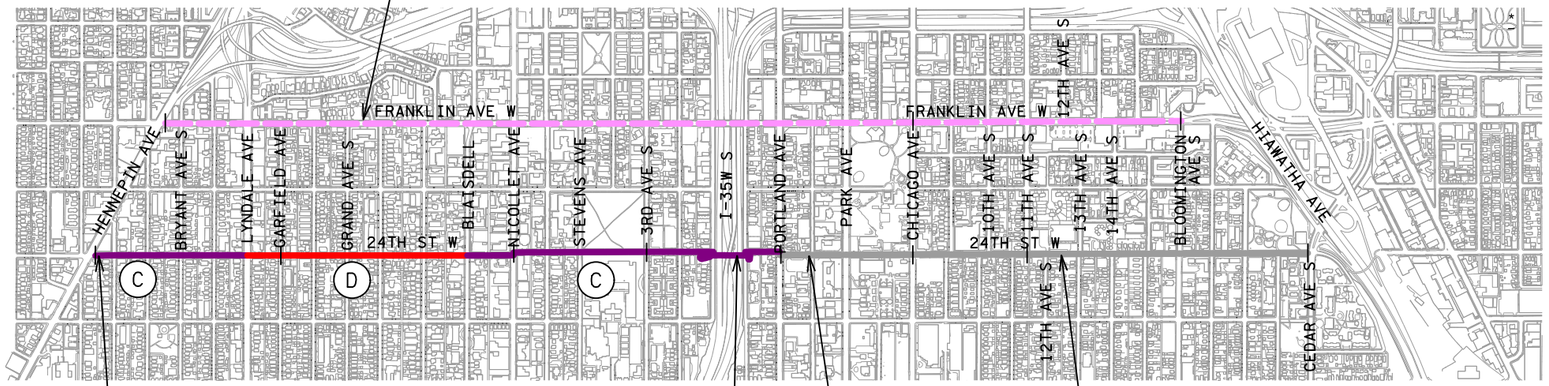
-Pavement Marking Unit Costs Assume: Removal at $10.00 per SF and $0.55 per LF. Thermoplastic Symbols (New Biker Message a $350.00 each, Bike Boulevard Symbol at $900.00 each), 12" Stop Bar/Buffer Paint Lines at $1.50 per LF, 4" Longitudinal Paint Lines at $0.25 per LF, 6" Longitudinal Paint Lines at $0.50 per LF, Unisignalized Mixing Zone at $400 Each Approach, Signalized Mixing Zone at $3,000 Each Approach.
-Signal Revisions: Assume a Revision at All Signals (Simple Signals Without Left Turn Phasing $5,000 Each, Complex Signals With Left Turn Phasing $10,000 Each).
-Seal Coat Assume: $4.00 per SQ YD.
-Delineators Assume: $100.00 Each. Number of Delineators Was Increased by 10%.
-Signs Assume: $200.00 Each Sign Post Assembly.
-Off-Street Trail: $65 per LF (Does not assume ROW Cost or Acquisition)

Appendix A:

Preliminary Corridor Concepts

FRANKLIN OR 24TH STREET (HENNEPIN TO HIAWATHA)-CONCEPT DESIGN 1

PROTECTED BIKE LANES ARE NOT FEASIBLE ON FRANKLIN AVE. OTHER ALTERNATIVE BIKE FACILITY TREATMENTS SHOULD BE EXPLORED.

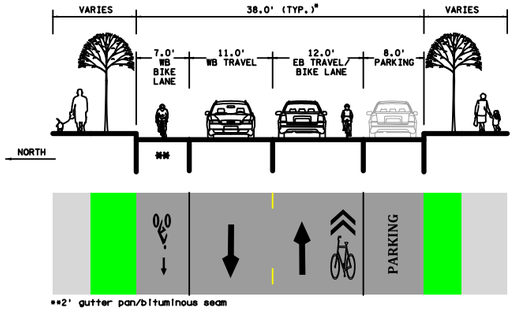


PLANNED RECONSTRUCTION OF PEDESTRIAN/BIKE BRIDGE.

24TH ST FROM I-35W TO CEDAR - MAINTAIN EXISTING BIKE LANES. PROTECTED BIKE LANES ARE NOT FEASIBLE WITHIN EXISTING ROADWAY WIDTH.

PORTLAND AVE TO PARK AVE:
BIKE LANE IN BOTH DIRECTIONS ARE FEASIBLE WITH PERMANENT PARKING REMOVAL. (BOTH SIDES)

24TH ST FROM HENNEPIN AVE TO I-35W - CONSIDER STANDARD BIKE LANES AND/OR SHARED LANE FACILITIES. FURTHER EVALUATION MAYBE NECESSARY:
1. MAINTAIN EXISTING PARKING.
2. EXCLUSIVE BIKE LANE IN ONE DIRECTION WITH A SHARED LANE IN THE OTHER DIRECTION; OR
3. SHARED LANE FACILITY IN BOTH DIRECTIONS; OR
4. BIKE LANE IN BOTH DIRECTIONS ON BLOCKS WHERE THERE CURRENTLY IS NO PARKING.
5. TRAFFIC SIGNAL IMPROVEMENTS ARE NOT EXPECTED NECESSARY. (PRETIMED OPERATION)



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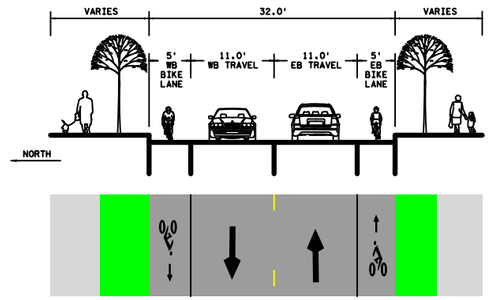
NICOLLET AVE TO 3RD AVE S: 39-40' WITH PARKING. SHARED LANES OR ADVISORY LANES FEASIBLE. BIKE LANES FEASIBLE WITH PARKING REMOVAL.

3RD AVE TO 4TH AVE: 32' WITH PARKING ON NORTH SIDE. SHARED LANES ARE FEASIBLE. BIKE LANES ARE FEASIBLE WITH PARKING REMOVAL.

HENNEPIN AVE TO LYNDALE AVE: 36' PARKING ON SOUTH SIDE. SHARED LANE FEASIBLE. BIKE LANE FEASIBLE WITH PARKING REMOVAL.

LYNDALE AVE TO GARFIELD AVE: 38' NO PARKING. BIKE LANE FEASIBLE.

BLAISDELL AVE TO NICOLLET AVE: 34' SUNDAY PARKING ON SOUTH SIDE. SHARED LANE FEASIBLE. BIKE LANE FEASIBLE WITH PARKING REMOVAL.



D GARFIELD AVE TO BLAISDELL AVE

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

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0 750 1500
HORIZONTAL SCALE IN FEET
SCALE 1500

MINNEAPOLIS DEPARTMENT OF PUBLIC WORKS

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
FRANKLIN OR 24TH STREET
(HENNEPIN TO HIAWATHA)
PRELIMINARY CONCEPT CORRIDOR 1

FIGURE A-1

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3/4/2015
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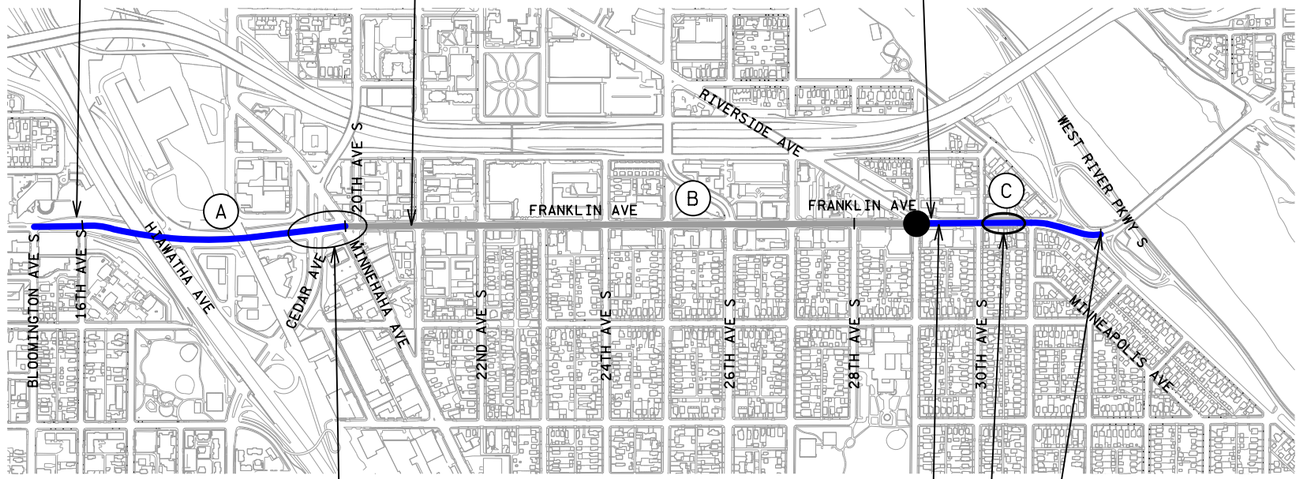
FRANKLIN AVE (HIAWATHA TO RIVER) - CONCEPT DESIGN 2

BLOOMINGTON AVE TO CEDAR AVE - ONE-WAY PROTECTED BIKE LANES ARE FEASIBLE.
HOWEVER,FURTHER EVALUATION AT ON STREET PARKING CONFIGURATION IS NEEDED:
1. PARKING ON BOTH SIDES OF EASTBOUND/WESTBOUND LANES PROHIBITS THE IMPLEMENTATION OF PROTECTED BIKE LANES.
2. PARKING ON THE INSIDE LANES ALLOWS PARKING MOTORIST DIRECT ACCESS TO EVENTS HELD IN THE MEDIAN BUT REQUIRES CROSSING A TRAVEL LANE TO ACCESS THE SIDEWALK ON THE SOUTH SIDE. IN ADDITION TRANSIT OPERATIONS WILL IMPEDE TRAFFIC FLOW.
4. PARKING ON THE RIGHT SIDE SHADOWS THE BUS STOP. DOES NOT REQUIRE FOLKS TO CROSS TRAFFIC LANES IN ACCESS OF THE SIDEWALK, BUT IS OFFSET FROM THE CURB, WHICH IS NOT TRADITIONAL.

20TH AVE TO 28TH AVE S - MAINTAIN EXISTING BIKE LANES.

HIGH WESTBOUND RIGHT TURN CONFLICT
1. PROVIDE RIGHT TURN MIXING ZONE
2. PROVIDE CONFLICT MARKINGS



NEED TO MAINTAIN TWO TRAVEL LANES EB IN APPROACH TO CEDAR AVE AND WESTBOUND IN APPROACH TO MINNEHAHA AVE (CONCEPT 2A).

28TH AVE S TO SEABURY AVE - ONE-WAY PROTECTED BIKE LANES

MAY NEED TO ADJUST LEFT TURN LANE ALIGNMENT

CONNECT TO EXISTING PROTECTED BIKE LANES

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
FRANKLIN AVE
(HIAWATHA TO RIVER)
PRELIMINARY CONCEPT CORRIDOR 2

FIGURE A-2
1 OF 2

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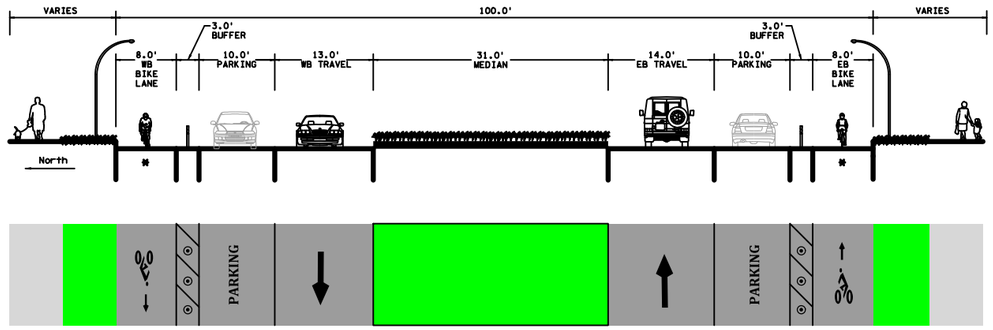
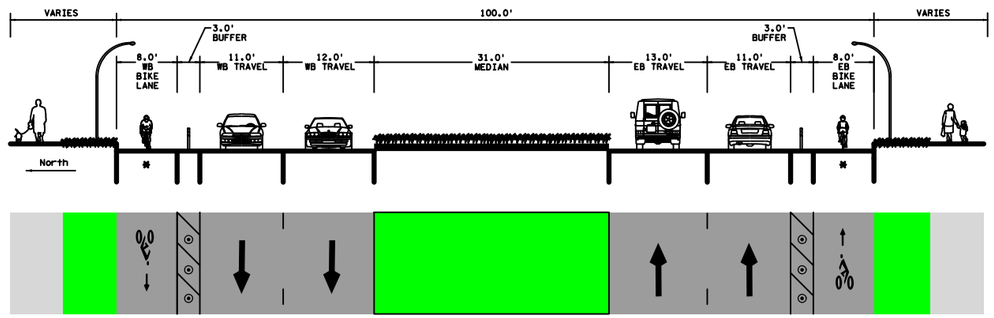
FRANKLIN AVE (HIAWATHA TO RIVER) - CONCEPT DESIGN 2



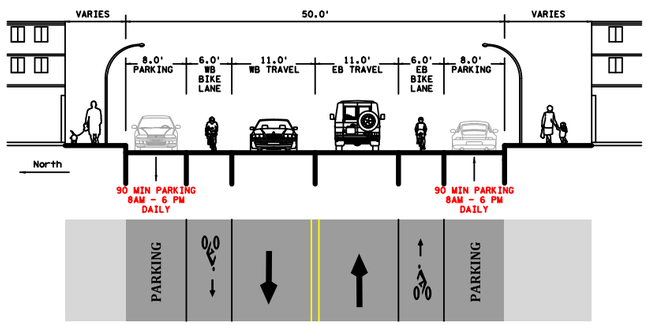
*8' CONCRETE INTEGRANT CURB AND GUTTER (POOR CONDITION)

(1A) BLOOMINGTON AVE TO CEDAR AVE

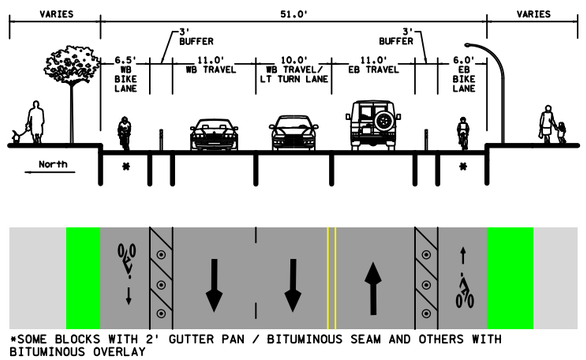


*8' CONCRETE INTEGRANT CURB AND GUTTER (POOR CONDITION)

(2A) CEDAR AVE TO MINNEHAHA AVE



(B) 20TH AVE S TO 28TH AVE S



*SOME BLOCKS WITH 2' GUTTER PAN / BITUMINOUS SEAM AND OTHERS WITH BITUMINOUS OVERLAY

(C) 28TH AVE S TO SEABURY AVE

-BIKE/BUFFER WIDTH LESS THAN 10'

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
FRANKLIN AVE
(HIAWATHA TO RIVER)
PRELIMINARY CONCEPT CORRIDOR 2

FIGURE A-2
2 OF 2

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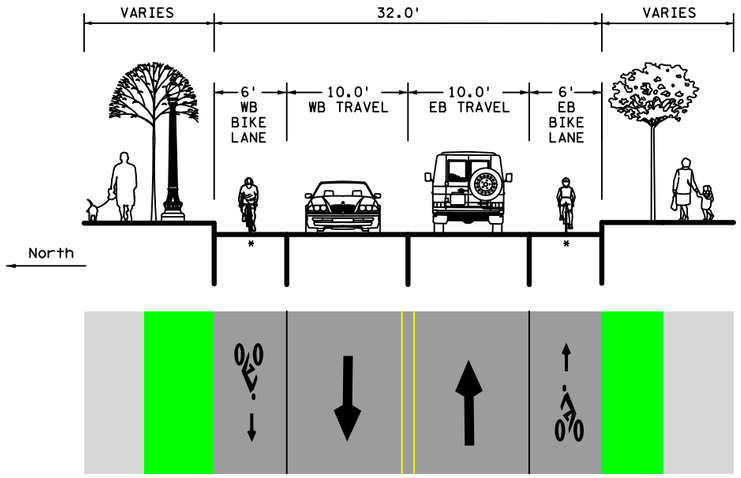
FRANKLIN AVE SE - CONCEPT DESIGN 3



* 2' GUTTER PAN / BITUMINOUS SEAM

(A) THORNTON ST SE TO EMERALD ST SE

(DESIGN EXCEPTION MAY BE REQUIRED)
THORNTON ST SE TO BRIDGE
MALCOLM AVE TO EMERALD ST

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

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HORIZONTAL SCALE IN FEET
SCALE 500

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
FRANKLIN AVE SE
PRELIMINARY CONCEPT
CORRIDOR 3

FIGURE A-3

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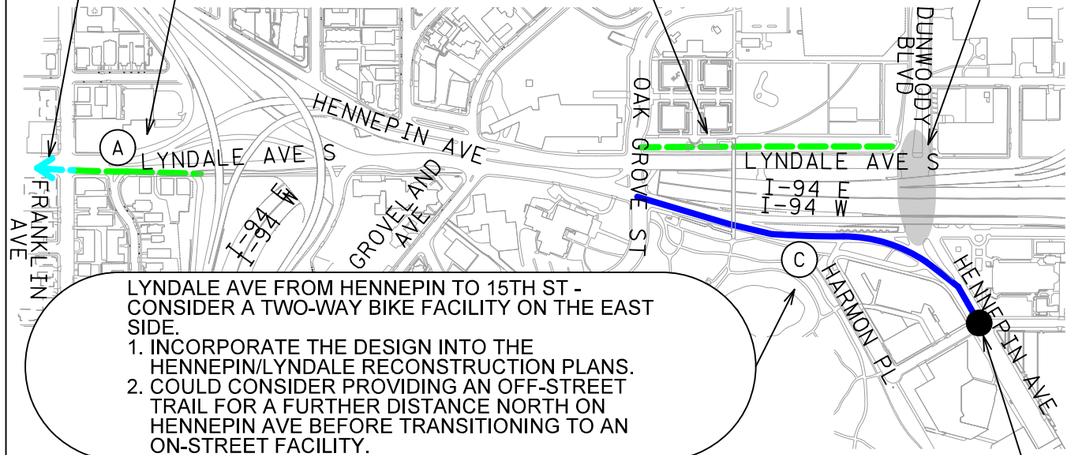
LORING BIKEWAY GAPS- CONCEPT DESIGN 4

LYNDALE AVE FROM FRANKLIN AVE TO I-94 - CONSIDER THE RECONSTRUCTION OF THE WEST CURB LINE TO CREATE A RAISED OFF-STREET TWO-WAY BIKE FACILITY. A 30% PRELIMINARY ENGINEERING IS NEEDEDTO DETERMINE:
1. DRAINAGE ISSUES
2. UTILITIY IMPACTS
3. PEDESTRIAN & PARKING IMPACTS AND FEASIBILITY
4. RIGHT TURN LANE SIGNALIZATION FEASIBILITY
5. CONDUCT FEASIBILITY STUDY TO EXTEND OFF-STREET TRAIL SOUTH TO 22ND OR 24TH STREET.

LYNDALE AVE FROM DUNWOODY BLVD TO 15TH ST - CONSIDER AN OFF -STREET TRAIL ON THE WEST SIDE OF LYNDALE AVE FROM DUNWOODY BLVD TO THE LORING PARK BRIDGE RAMP ENTRANCE. COORDINATION WILL BE NEEDED WITH THE PARK BOARD, SCULPTURE GARDEN AND LYNDALE/HENNEPIN DESIGN TEAM.

SEE NOTE 5

CONNECTION TO FUTURE DUNWOODY BLVD TRAIL COULD BE VIA A TWO-WAY OFF-STREET TRAIL ON THE SOUTH SIDE OF DUNWOODY BETWEEN LYNDALE AND HENNEPIN.



LYNDALE AVE FROM HENNEPIN TO 15TH ST - CONSIDER A TWO-WAY BIKE FACILITY ON THE EAST SIDE.
1. INCORPORATE THE DESIGN INTO THE HENNEPIN/LYNDALE RECONSTRUCTION PLANS.
2. COULD CONSIDER PROVIDING AN OFF-STREET TRAIL FOR A FURTHER DISTANCE NORTH ON HENNEPIN AVE BEFORE TRANSITIONING TO AN ON-STREET FACILITY.

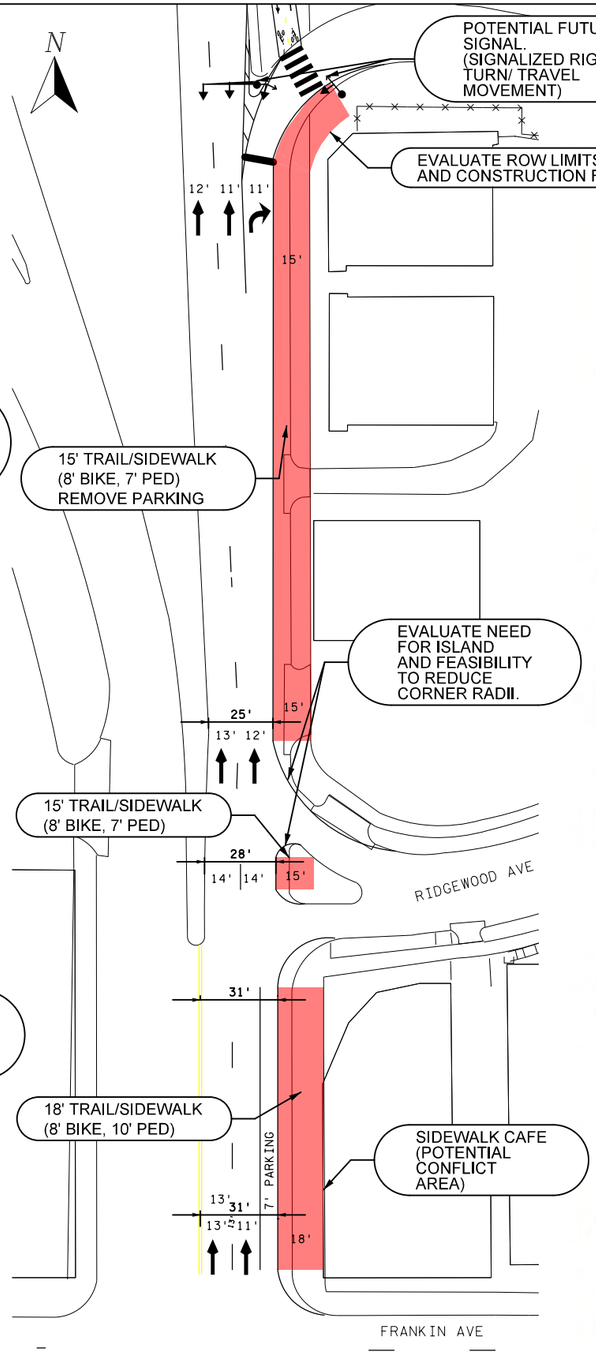
BUS STOP
1. REMOVE OR RELOCATE.
2. PROVIDE TWO STAGE LEFT TURN.

LEGEND

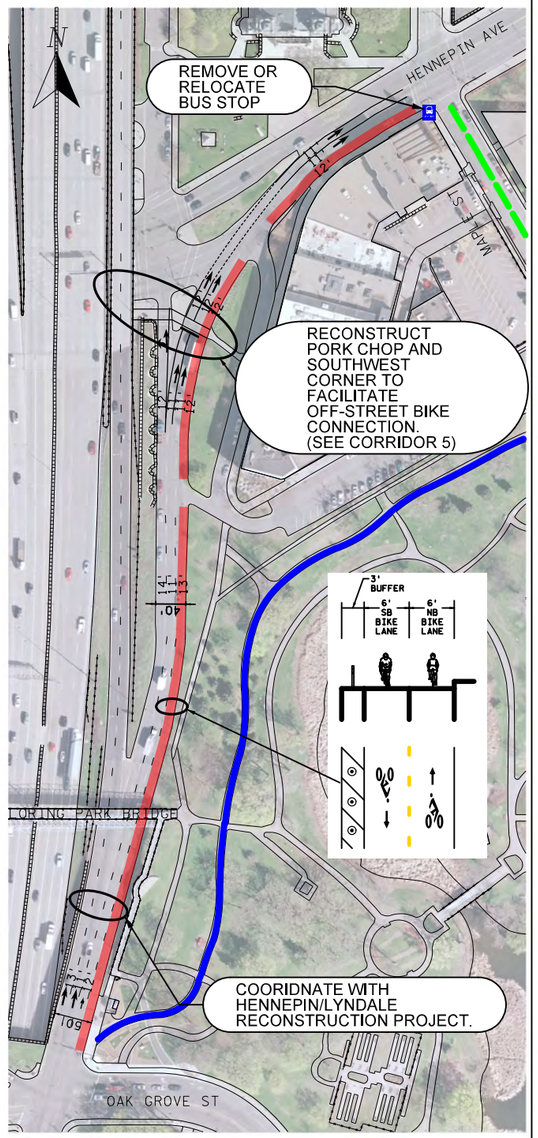
- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.



A FRANKLIN AVE TO LORING GREENWAY BRIDGE



C OAKGROVE TO HENNEPIN AVE/MAPLE ST

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HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
LORING BIKEWAY GAPS
PRELIMINARY CONCEPT
CORRIDOR 4

FIGURE A-4

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HENNEPIN OR 1ST & DUNWOODY-CONCEPT DESIGN 5

DUNWOODY BLVD FROM CEDAR LAKE TRAIL TO DUNWOODY INSTITUTE - OFF-STREET TRAIL IS RECOMMENDED.

THE OFF-STREET TRAIL WILL CROSS FROM THE NORTH SIDE OF DUNWOODY BLVD TO THE SOUTH SIDE AT THE SIGNAL. CONSIDER INTERSECTION MODIFICATIONS.

ON-STREET PROTECTED BIKE FACILITY IS NOT FEASIBLE. CONSIDERATIONS:
1. PROVIDE OFF STREET TRAIL ON SOUTH SIDE OF DUNWOODY.
2. MAKE CONNECTIONS TO LORING PARK AND DOWNTOWN AT LYNDALE AVE INTERSECTION (SEE ALSO CORRIDOR 4)

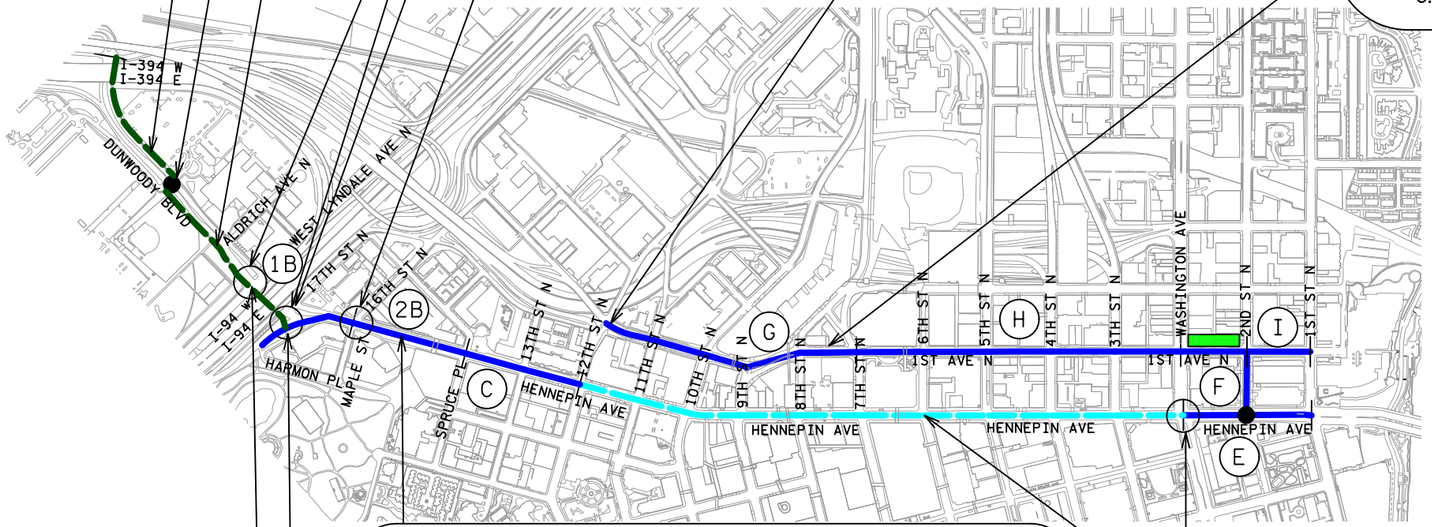
RECONSTRUCT PORK CHOP ISLANDS TO FACILITATE SAFE BIKE MOVEMENTS

DUNWOODY BLVD- A TWO WAY PROTECTED BIKEWAY IS FEASIBLE ON SOUTH SIDE. CONSIDERATIONS:
1. PROVIDE CONNECTIONS TO HENNEPIN AVE INTO DOWNTOWN AND LORING PARK (SEE CORRIDOR 4)
2. PROVIDE CONNECTION TO FUTURE DUNWOODY BLVD OFF STREET TRAIL

RELOCATE OR REMOVE EB BUS STOP

IMPROVE CONNECTION TO 12TH ST

1ST AVE FROM 12TH ST TO 1ST ST - ONE-WAY PROTECTED BIKE LANES THROUGH ADDING DELINEATORS TO EXISTING BUFFERS
1. ADD BUFFER/DELINEATORS TO ALL BLOCKS.
2. CONSIDER PURSUING A DESIGN EXCEPTION BETWEEN 7TH ST AND 12TH ST TO PROVIDE PROTECTED BIKE LANES WITH A BUFFER.
3. FURTHER EVALUATION OF LONG TERM FACILITY IN CONJUCTION WITH HENNEPIN AVE IS NEEDED.



HENNEPIN AVE FROM LYNDALE AVE TO 12TH ST - MAINTAIN EXISTING BUFFERED BIKE LANES
1. ADD DELINEATORS TO THE EXISTING BUFFER.
2. MAINTAIN BUFFER ONLY IN AREAS ADJACENT TO PARKING

1. EVALUATE CONNECTIONS TO WASHINGTON AVE CYCLE TRACK.
2. COORDINATE WITH STREET CAR PLAN AND CONSIDERSTIONS

TWO WAY PROTECTED BIKEWAY (SEE CORRIDOR 4)

MAINTAIN CONNECTION FROM OFF-STREET TRAIL TO ON-STREET BIKE LANE.

HENNEPIN AVE FROM 12TH ST S TO 1ST ST N - PROTECTED BIKE LANES ARE NOT FEASIBLE WITH IN EXISTING CURBS. MAINTAIN EXISTING SHARED LANE BIKE FACILITY. FURTHER EVALUATION OF LONG TERM BICYCLE FACILITY IS NECESSARY. MAINTAIN PROTECTED BIKE LANES ON 1ST AVE N PENDING FUTURE CHANGES ON HENNEPIN AVE.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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HORIZONTAL SCALE IN FEET
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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
HENNEPIN OR 1ST & DUNWOODY
PRELIMINARY CONCEPT
CORRIDOR 5

FIGURE A-5
1 OF 2

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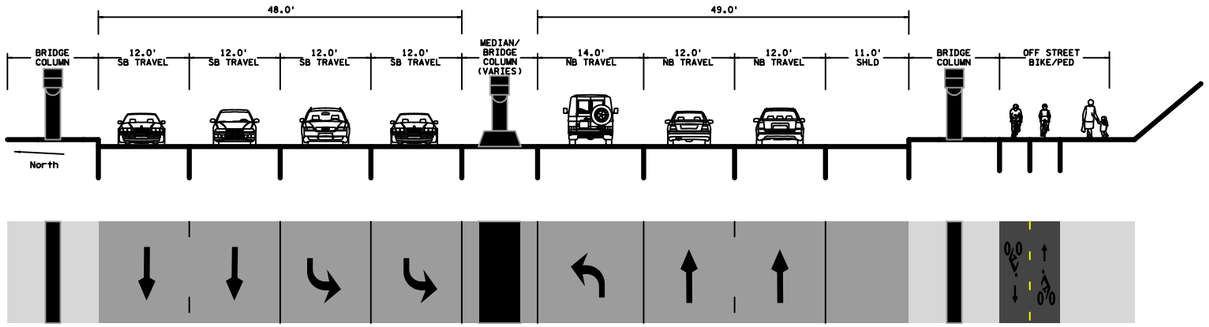
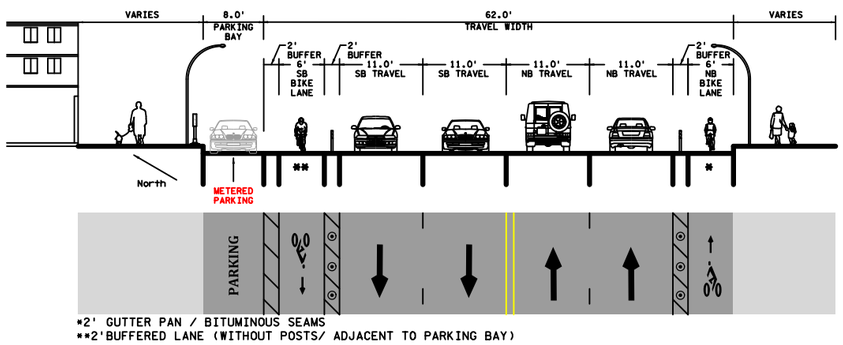
HENNEPIN OR 1ST & DUNWOODY-CONCEPT DESIGN 5



1B HENNEPIN AVE/DUNWOODY BLVD - LYNDALE AVE TO HENNEPIN AVE

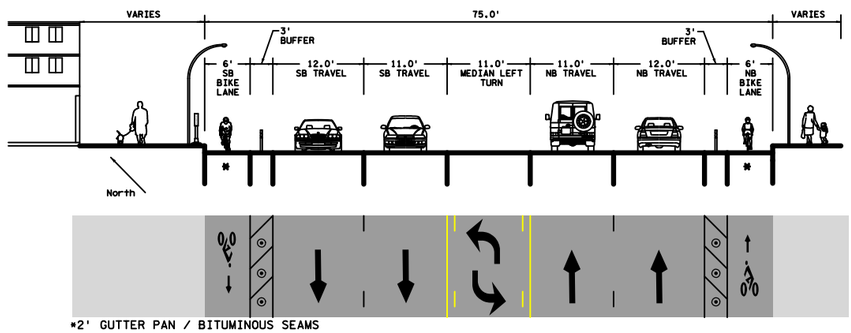
NOTE: SEE CORRIDOR 4 FOR HENNEPIN AVE TO MAPLE ST. BLOCK



*2' GUTTER PAN / BITUMINOUS SEAMS
**2'BUFFERED LANE (WITHOUT POSTS/ ADJACENT TO PARKING BAY)

C HENNEPIN AVE - SPRUCE PL TO 12TH ST

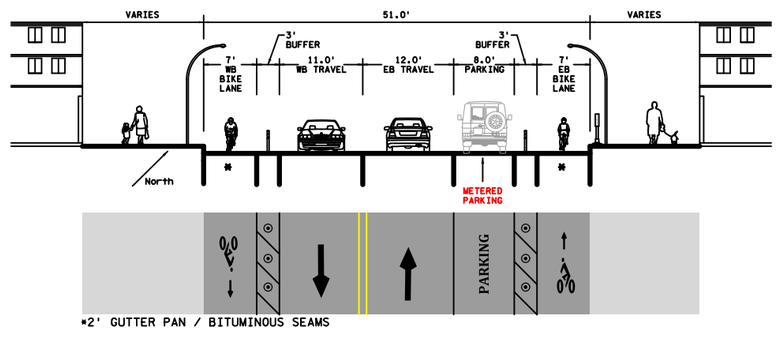
-BIKE/BUFFER WIDTH LESS THAN 10'



*2' GUTTER PAN / BITUMINOUS SEAMS

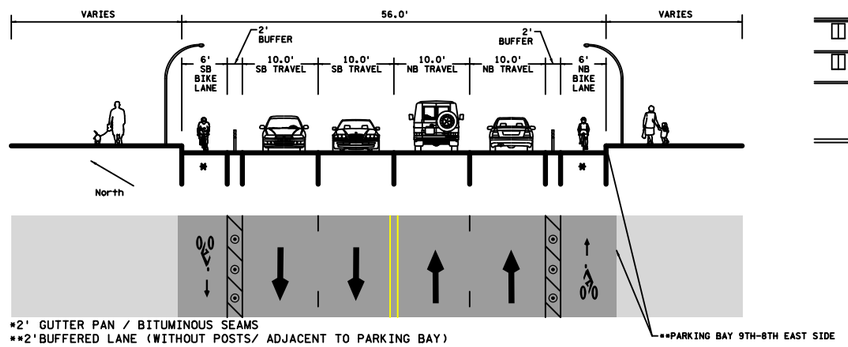
E HENNEPIN AVE - WASHINGTON AVE TO 1ST ST S

-BIKE/BUFFER WIDTH LESS THAN 10'



*2' GUTTER PAN / BITUMINOUS SEAMS

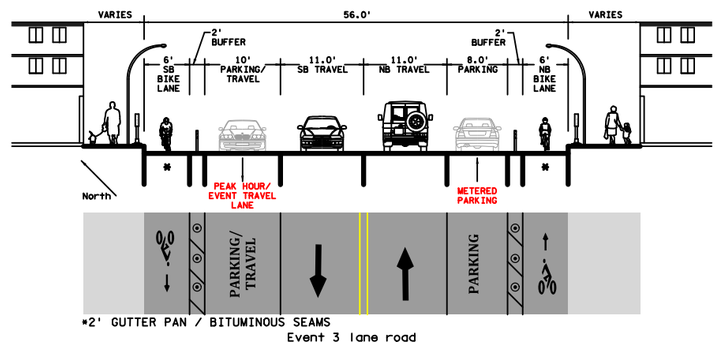
F 2ND ST - HENNEPIN AVE TO 1ST AVE



*2' GUTTER PAN / BITUMINOUS SEAMS
**2'BUFFERED LANE (WITHOUT POSTS/ ADJACENT TO PARKING BAY)

G 1ST AVE - 12TH ST N TO 7TH ST N

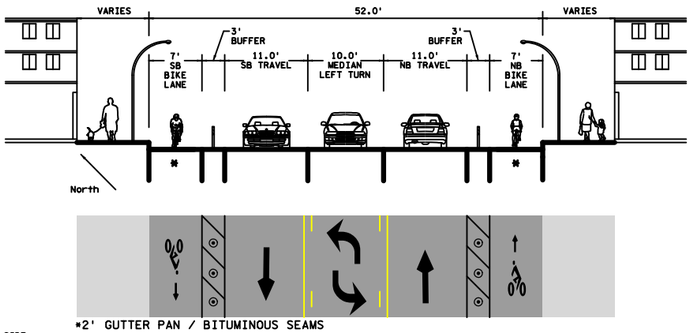
-DESIGN EXCEPTION REQUIRED
-BIKE/BUFFER WIDTH LESS THAN 10'



*2' GUTTER PAN / BITUMINOUS SEAMS
Event 3 lane road

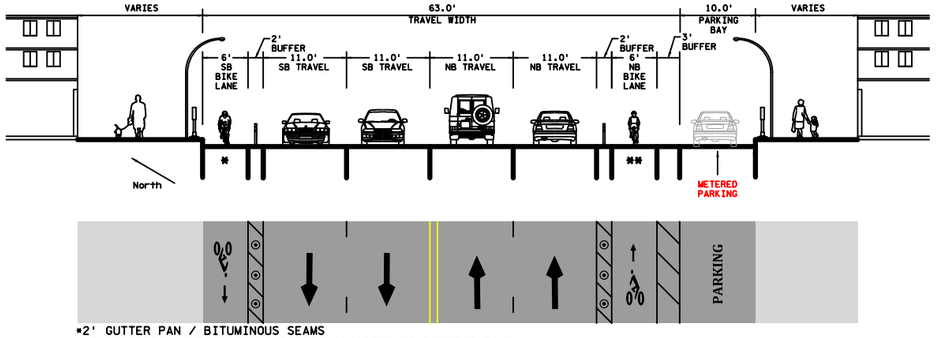
H 1ST AVE - 7TH ST N to WASHINGTON AVE

-BIKE/BUFFER WIDTH LESS THAN 10'



*2' GUTTER PAN / BITUMINOUS SEAMS

I 1ST AVE - WASHINGTON AVE TO 1ST ST N



*2' GUTTER PAN / BITUMINOUS SEAMS
**2'BUFFERED LANE (WITHOUT POSTS/ ADJACENT TO PARKING BAY)

2B HENNEPIN AVE - MAPLE ST TO SPRUCE PL

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
HENNEPIN OR 1ST & DUNWOODY
PRELIMINARY CONCEPT
CORRIDOR 5

FIGURE A-5
2 OF 2

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HENNEPIN/1ST NE & 5TH ST NE - CONCEPT DESIGN 6

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

1ST S TO BRIDGE - A ONE-WAY PROTECTED/BUFFERED FACILITY IS FEASIBLE.
1. MAINTAIN EXISTING SB BIKE LANES.
2. BUFFER THE LEFT TURN BIKE LANE AND REMOVE A NORTHBOUND TRAVEL LANE.

HENNEPIN AVE BRIDGE - CONSIDER A ONE-WAY PROTECTED BIKE FACILITY.
CONSIDERATIONS:
1. THE USE OF JERSEY BARRIER COULD BE A LANE SEPARATION OPTION.
2. FURTHER EVALUATION REGARDING THE NEED FOR 2 OR 3 TRAVEL LANES SHOULD BE COMPLETED IN CONSIDERATION OF STREET CAR OPERATIONS AND STATION STOP.
3. MAINTAIN LANE CONTINUITY WITH SEGMENTS NORTH AND SOUTH OF THE BRIDGE.

1ST AVE FROM THE BRIDGE TO 5TH ST - A ONE-WAY PROTECTED FACILITY WITH THE REMOVAL OF A TRAVEL LANE OR ON STREET PARKING.
1. FURTHER EVALUATION OF STREET CAR OPERATIONS AND DETAILED TRAFFIC OPERATION ANALYSIS IS NEEDED BEFORE DETERMINING FEASIBILITY OF REMOVING A TRAVEL LANE.
2. THERE MAY BE OPPORTUNITY TO PROVIDE CURB EXTENSIONS OR PEDESTRIAN/BICYCLE ENHANCEMENTS. FURTHER EVALUATION IS NEEDED.

AT UNIVERSITY CONSIDER REMOVING THE INSIDE SHARED THRU/RIGHT TURN LANE. (SEE TYPICAL J)

5TH ST NE - MAINTAIN EXISTING BIKE LANES/SHARED LANES. THE CITY SHOULD INVESTIGATE PARKING REMOVAL ON ONE SIDE (1ST AVE TO 3RD AVE) TO ACCOMMODATE BIKE LANES IN BOTH DIRECTIONS.

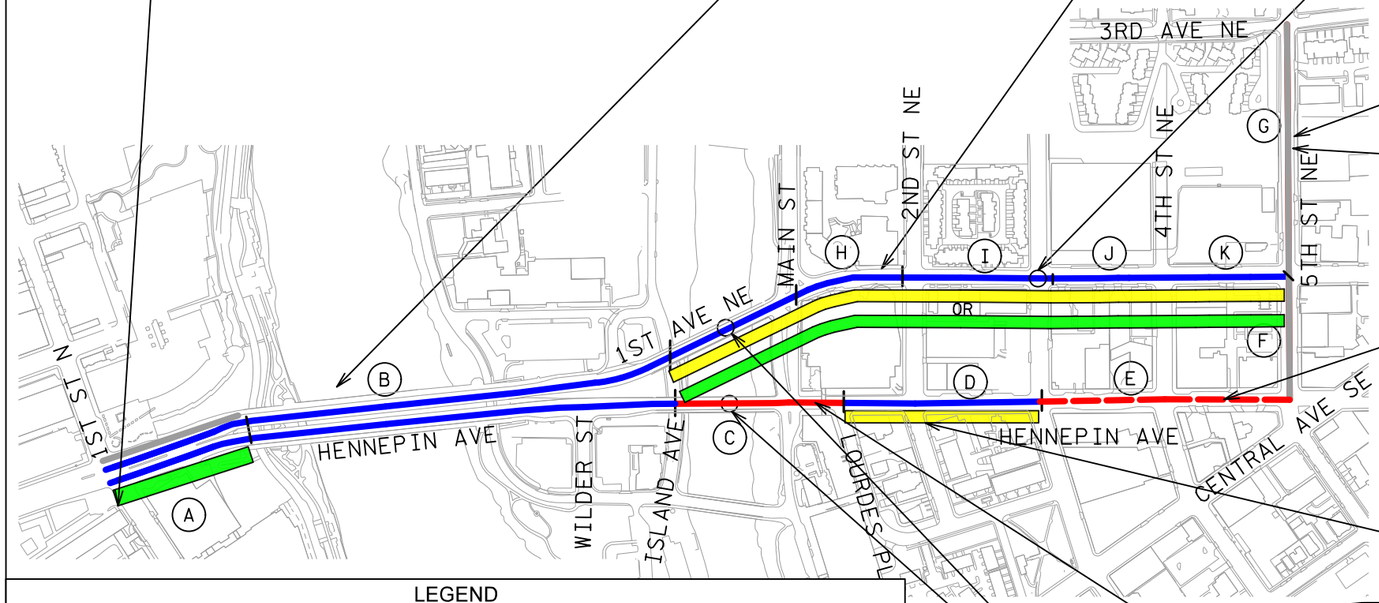
STEEP HILL ON BRIDGE

HENNEPIN AVE FROM UNIVERSITY AVE TO 5TH ST - ONE WAY PROTECTED FACILITY IS NOT LIKELY FEASIBLE.
CONSIDERATIONS:
1. 3 TRAVEL LANES ARE NEEDED.
2. ALL ON STREET PARKING IS WITHIN CURB CUT BAYS AND CANNOT EASILY BE SWITCHED WITH THE BIKE LANE TO CREATE A PROTECTED LANE.
3. BUFFERED BIKE LANES ARE PREFERRED NEXT TO OUTSIDE PARKING LANE.
4. FURTHER EVALUATION AT CONCRETE PANEL JOINTS AND PROPOSED LANE LINES LOCATIONS IS NEEDED TO DETERMINE FEASIBILITY OF CHANGING LANE WIDTHS.

1. ONLY PM PEAK HOUR PARKING RESTRICTION.
2. FURTHER EVALUATION OF CONCRETE PANEL JOINTS AND PROPOSED LANE LINES LOCATIONS IS NEEDED TO DETERMINE FEASIBILITY OF CHANGING LANE WIDTHS.

HENNEPIN AVE FROM THE BRIDGE TO UNIVERSITY AVE - A ONE-WAY PROTECTED BIKE LANE IS FEASIBLE.
1. THE NEED FOR 2 OR 3 TRAVEL LANES SHOULD BE COMPLETED IN CONSIDERATION OF STREET CAR OPERATIONS AND STATION STOPS.
2. TWO LANES MAY BE FEASIBLE DURING MOST OF THE DAY AND PARKING ON THE EAST SIDE COULD BE RESTRICTED DURING THE PM PEAK PERIOD TO FACILITATE 3 LANES.

STANDARD BIKE LANES MAY BE REQUIRED BETWEEN ISLAND AVE AND MAIN ST IF 3 LANES ARE MAINTAINED.



LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

0 250 500
HORIZONTAL SCALE IN FEET
SCALE 500

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
HENNEPIN/1ST NE & 5TH ST NE
PRELIMINARY CONCEPT
CORRIDOR 6

FIGURE A-6
1 OF 2

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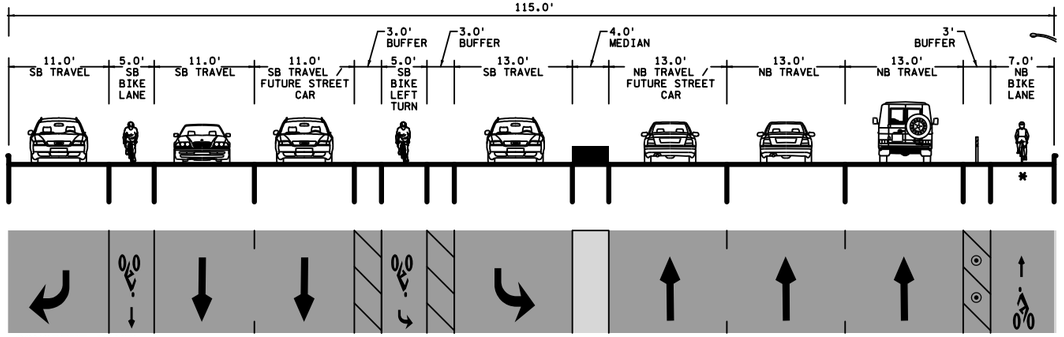
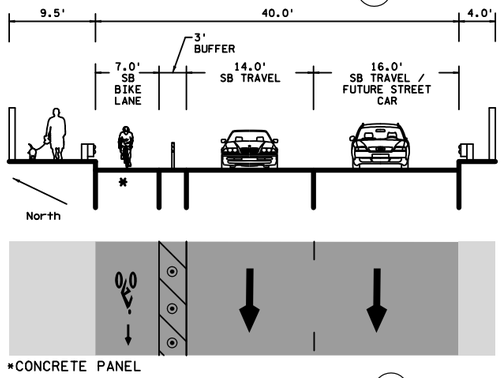
HENNEPIN/1ST NE & 5TH ST NE - CONCEPT DESIGN 6



*CONCRETE PANEL

(A) 1ST ST S TO BRIDGE



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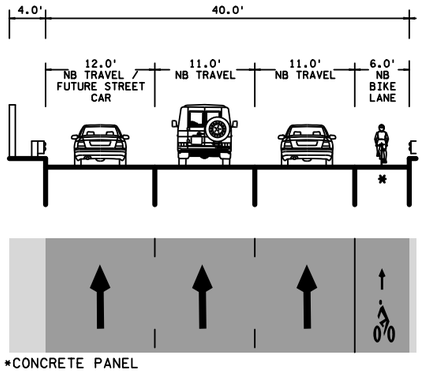
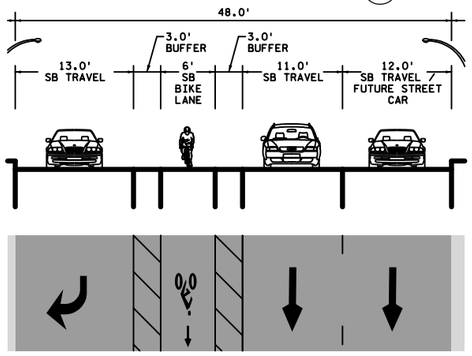
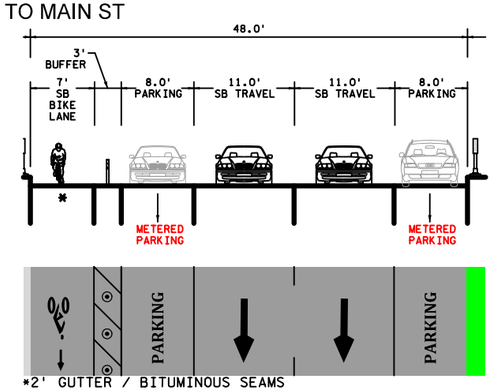


*CONCRETE PANEL

(C) ISLAND AVE TO MAIN ST

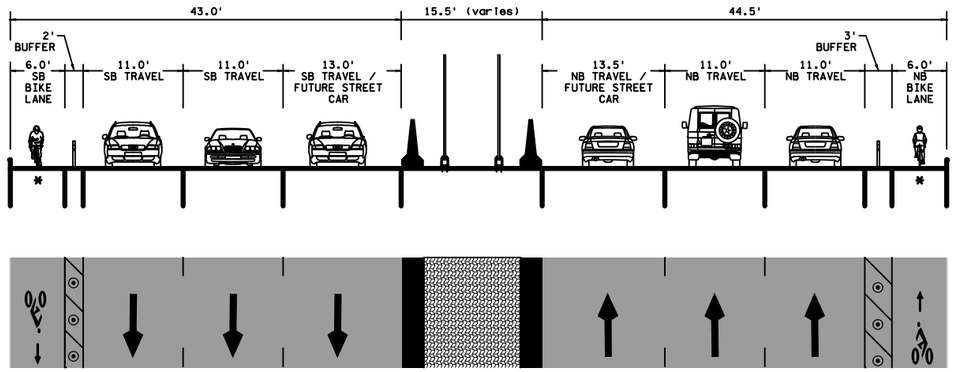


(H) 1ST AVE NE FROM MAIN ST TO 2ND ST NE



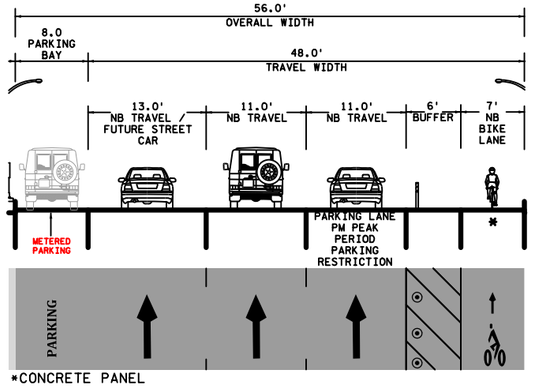
*2' GUTTER / BITUMINOUS SEAMS

(I) 1ST AVE NE FROM 2ND ST NE TO UNIVERSITY AVE



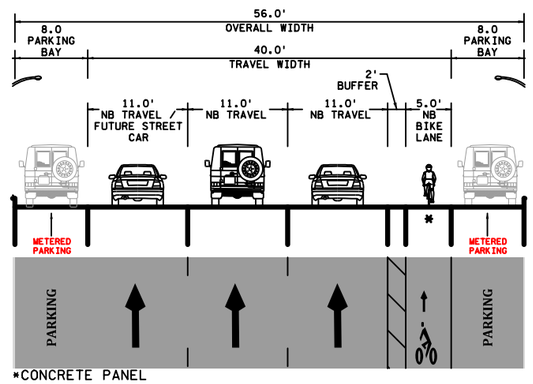
*CONCRETE PANEL

(B) BRIDGE (3 TRAVEL LANE OPTION IS SHOWN)
-BIKE/BUFFER WIDTH LESS THAN 10'



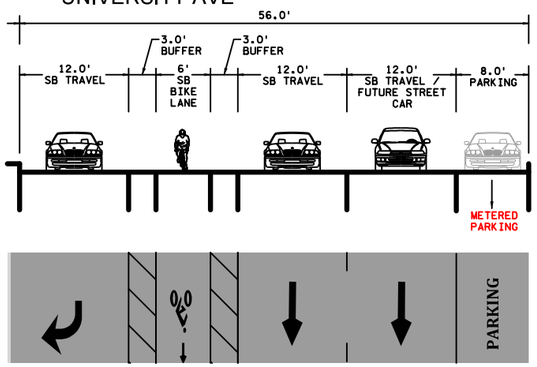
*CONCRETE PANEL

(D) HENNEPIN AVE FROM LOURDES PL TO UNIVERSITY AVE



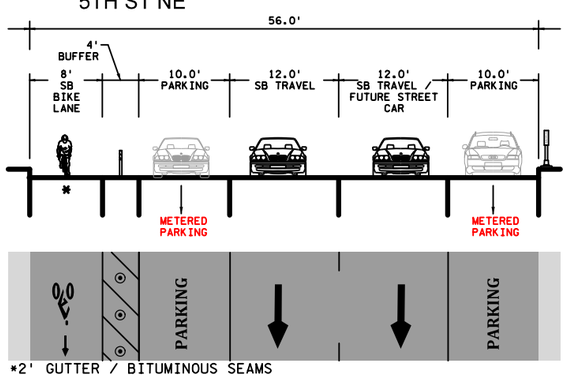
*CONCRETE PANEL

(E) HENNEPIN AVE FROM UNIVERSITY AVE TO 5TH ST NE



(J)

1ST AVE NE FROM UNIVERSITY AVE 4TH ST NE



*2' GUTTER / BITUMINOUS SEAMS

(K) 1ST AVE NE FROM 4TH ST NE TO 5TH ST NE

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
HENNEPIN/1ST NE & 5TH ST NE
PRELIMINARY CONCEPT
CORRIDOR 6

FIGURE A-6
2 OF 2

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MARQUETTE &/OR 2ND AVE S AND GRANT - CONCEPT DESIGN 7

GRANT ST FROM WILLOW TO LASALLE - TWO-WAY PROTECTED BIKE FACILITY ON THE SOUTH SIDE OF THE STREET THROUGH NARROWING LANES.

GRANT ST FROM LASALLE TO MARQUETTE - TWO-WAY PROTECTED BIKE FACILITY ON THE SOUTH SIDE OF THE STREET THROUGH THE REMOVAL OF AN EASTBOUND TRAVEL LANE

MARQUETTE AVE FROM GRANT ST TO 12TH ST
DESIGN CONSIDERATIONS:
1. SOUTHBOUND BIKES ARE PERMITTED IN BUS LANE AND WILL SERVE AS A CONNECTION DURING OFF PEAK PERIODS.
2. A STANDARD BIKE LANE COULD BE USED IN THE NORTHBOUND DIRECTION WITHOUT REQUIRING A DESIGN EXCEPTION.

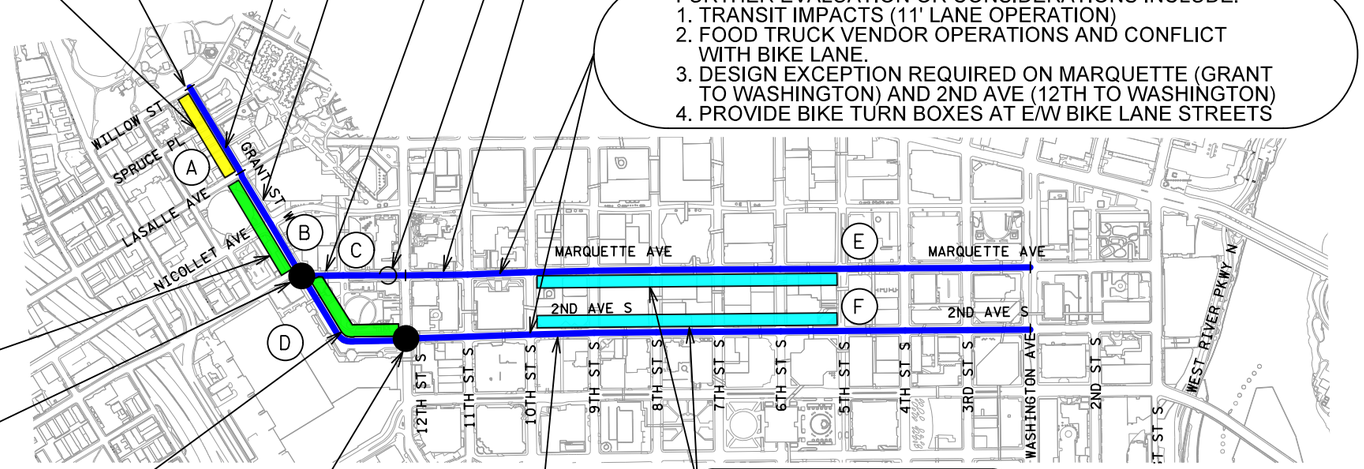
TRAIL HEAD CONNECTION AT LORING PARK
(SOUTH SIDE OF GRANT ST - BIKE PATH TRAILHEAD NEAR YALE PL & WILLOW ST)

SIGHT LINE OBSTRUCTION AT PARKING RAMP DRIVEWAY(BLIND APPROACH)

FURTHER INVESTIGATION INTO PARKING REMOVAL MAY BE NEEDED IF NARROW TRAVEL WAY BECOMES PROBLEMATIC.

MARQUETTE FROM GRANT TO WASHINGTON - ONE-WAY PROTECTED BIKE FACILITY ON THE NORTH SIDE OF THE STREET THROUGH LANE NARROWING.

FURTHER EVALUATION OR CONSIDERATIONS INCLUDE:
1. TRANSIT IMPACTS (11' LANE OPERATION)
2. FOOD TRUCK VENDOR OPERATIONS AND CONFLICT WITH BIKE LANE.
3. DESIGN EXCEPTION REQUIRED ON MARQUETTE (GRANT TO WASHINGTON) AND 2ND AVE (12TH TO WASHINGTON)
4. PROVIDE BIKE TURN BOXES AT E/W BIKE LANE STREETS



REMOVE EB TRAVEL LANE

INTERSECTION IMPROVEMENTS:
1. EXCLUSIVE BIKE SIGNAL PHASE IS FEASIBLE
2. COLORED BIKE LANE MARKINGS

REMOVE WB TRAVEL LANE

FURTHER EVALUATION IS NEEDED:
1. SIGNAL OPERATION TREATMENT TO CONNECT NORTHBOUND BIKES TO 2ND AVE BUS LANE DURING OFF PEAK PERIODS. (SEGMENT D TO F - TRANSITION BIKES FROM LEFT SIDE TO RIGHT SIDE OF ROAD)
2. CONFLICT ZONE LANE MARKINGS.

RELOCATE FOOD TRUCKS

2ND AVE FROM GRANT TO WASHINGTON ONE-WAY PROTECTED BIKE FACILITY THROUGH LANE NARROWING.

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
MARQUETTE &/OR 2ND AVE S
AND GRANT
PRELIMINARY CONCEPT CORRIDOR 7

FIGURE
A-7
1 OF 2

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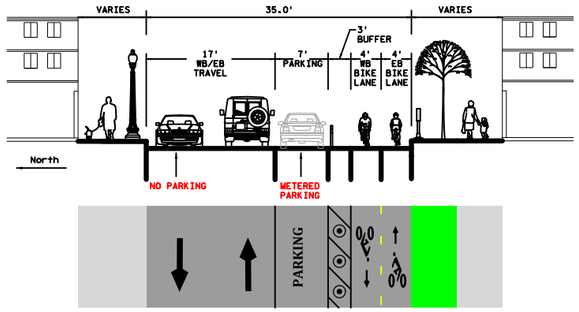
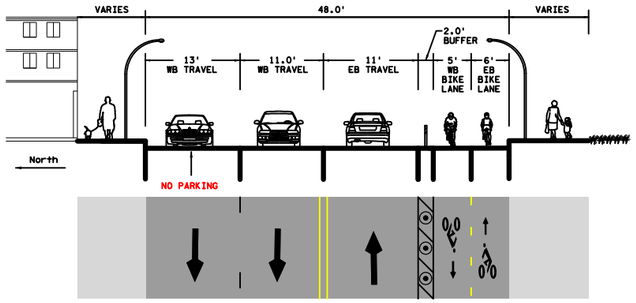
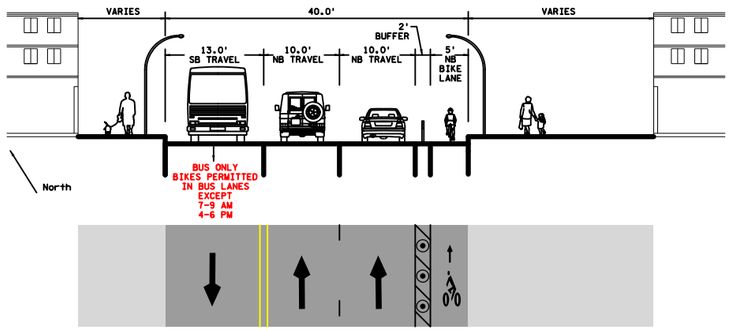
MARQUETTE &/OR 2ND AVE S AND GRANT - CONCEPT DESIGN 7



A WILLOW ST TO LASALLE AVE

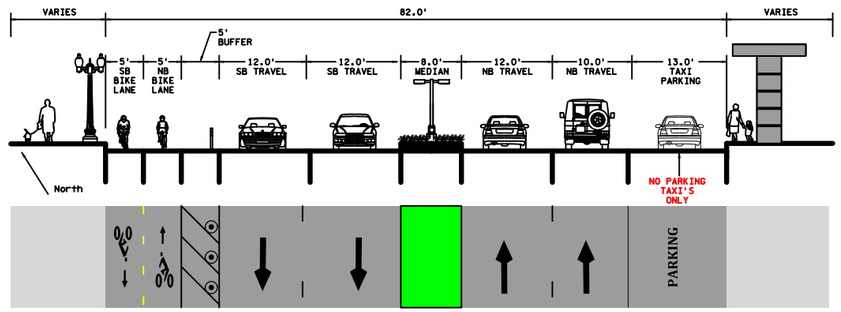


B LASALLE AVE TO 1ST AVE S

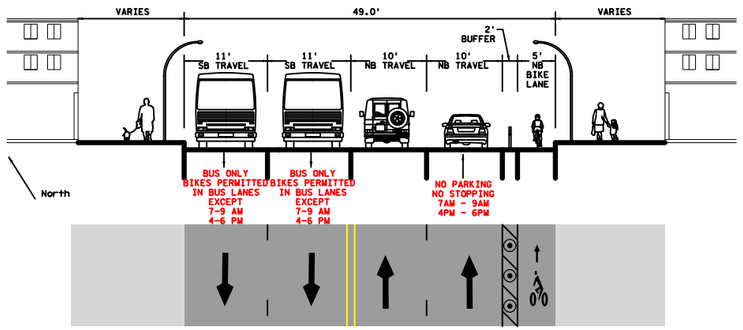


C GRANT ST TO 12TH ST S

-DESIGN EXCEPTION REQUIRED
-BIKE/BUFFER WIDTH LESS THAN 10'

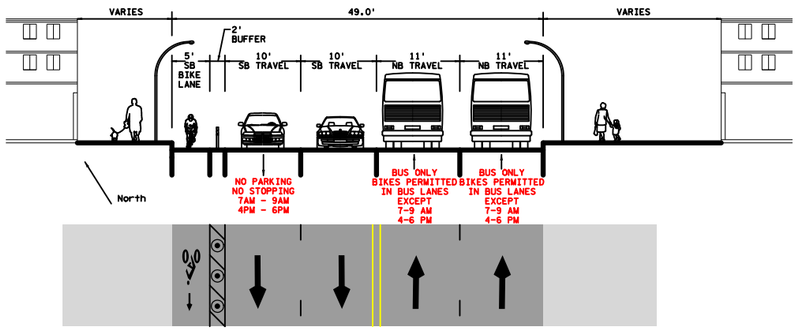


D 1ST AVE S TO 12TH ST S



E 12TH ST S TO WASHINGTON AVE

-DESIGN EXCEPTION REQUIRED
-BIKE/BUFFER WIDTH LESS THAN 10'



F 12TH ST S TO WASHINGTON AVE

-DESIGN EXCEPTION REQUIRED
-BIKE/BUFFER WIDTH LESS THAN 10'

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
MARQUETTE &/OR 2ND AVE S
AND GRANT
PRELIMINARY CONCEPT CORRIDOR 7

FIGURE
A-7
2 OF 2

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PARK AVE & PORTLAND AVE-CONCEPT DESIGN 8

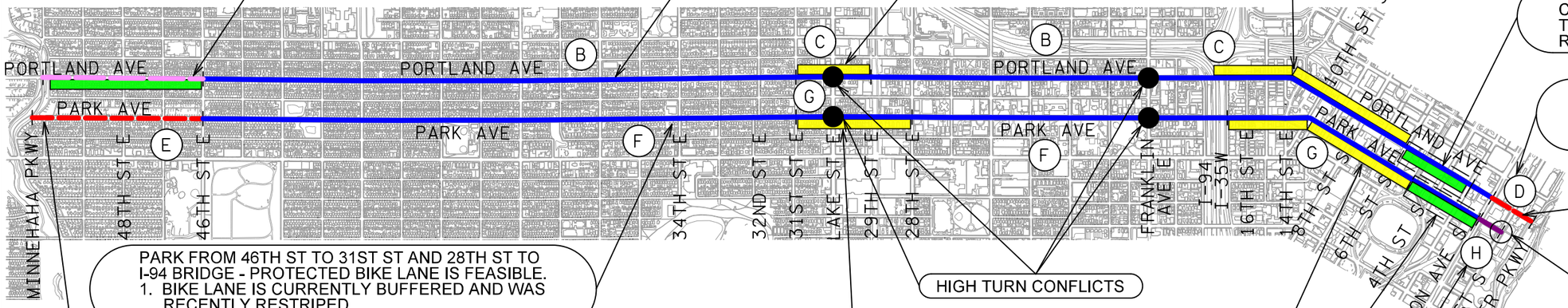
LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

PORTLAND FROM MINNEHAHA TO 46TH ST -PROTECTED OR BUFFERED BIKE LANES ON BOTH SIDES IS FEASIBLE WITH THE REMOVAL OF THE CENTER LEFT TURN LANE.
1. HENNEPIN COUNTY IS CURRENTLY WORKING WITH THE NEIGHBORHOOD ON A CONCEPT FOR 2015 IMPLEMENTATION.

PORTLAND FROM 46TH ST TO 31ST ST AND 29TH ST TO FRANKLIN AVE- ONE-WAY PROTECTED BIKE LANE IS FEASIBLE.
1. BIKE LANE IS CURRENTLY BUFFERED AND WAS RECENTLY RESTRIPED
2. REVERSE PARKING AND BIKE LANES

PORTLAND FROM 31ST ST TO 29TH ST AND FRANKLIN AVE TO 5TH ST- ONE-WAY PROTECTED BIKE LANE IS FEASIBLE. THREE TRAVEL LANES SHOULD BE MAINTAINED DURING AM/PM PEAK PERIODS.
1. RESTRICT PARKING ON THE WEST SIDE DURING PEAK PERIODS. FURTHER EVALUATION IS NEEDED.
2. OFF PEAK PARKING CAN BE PROVIDED IN THE RIGHT TRAVEL LANE.



PARK FROM 46TH ST TO 31ST ST AND 28TH ST TO I-94 BRIDGE - PROTECTED BIKE LANE IS FEASIBLE.
1. BIKE LANE IS CURRENTLY BUFFERED AND WAS RECENTLY RESTRIPED
2. REVERSE PARKING AND BIKE LANES

HIGH TURN CONFLICTS

PARK FROM 31ST ST TO 28TH ST AND I-94 BRIDGE TO 5TH ST- ONE-WAY PROTECTED BIKE LANE IS FEASIBLE. THREE TRAVEL LANES SHOULD BE MAINTAINED DURING THE AM/PM PEAK PERIOD.
1. RESTRICT PARKING ON THE WEST SIDE DURING PEAK PERIODS. FURTHER EVALUATION IS NEEDED.
2. OFF PEAK PARKING CAN BE PROVIDED IN THE RIGHT TRAVEL LANE.

PARK FROM MINNEHAHA TO 46TH ST -PROVIDE BUFFERED BIKE LANES ON BOTH SIDES

PARK FROM 5TH ST TO WASHINGTON- COORDINATE WITH DOWNTOWN PEDESTRIAN REALM AUGMENTATION STUDY.

PARK FROM WASHINGTON TO 2ND ST- STANDARD BIKE LANE IN THE NORTHBOUND DIRECTION OR SHARED LANES IN BOTH DIRECTIONS IS FEASIBLE

3RD STREET TO 6TH STREET- COORDINATE BIKE LANES WITH THE DOWNTOWN PEDESTRIAN REALM AUGMENTATION STUDY.

PORTLAND FROM WASHINGTON TO W RIVER PKWY -BUFFERED BIKE LANES ON BOTH SIDES IS FEASIBLE.

STEEP HILL. WIDE UPHILL LANES PREFERRED

THROUGH-STOP CONTROL- CHALLENGING LEFT TURN DURING PM PEAK

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
PARK/PORTLAND
PRELIMINARY CONCEPT
CORRIDOR 8

FIGURE A-8
1 OF 2

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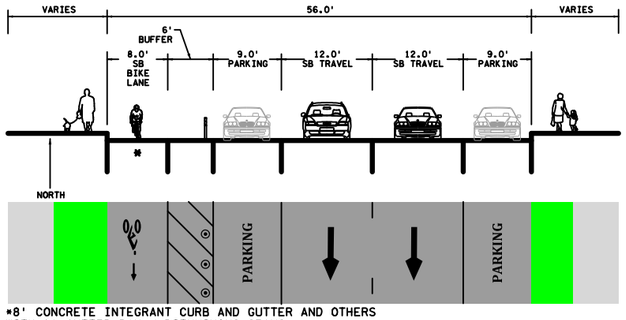
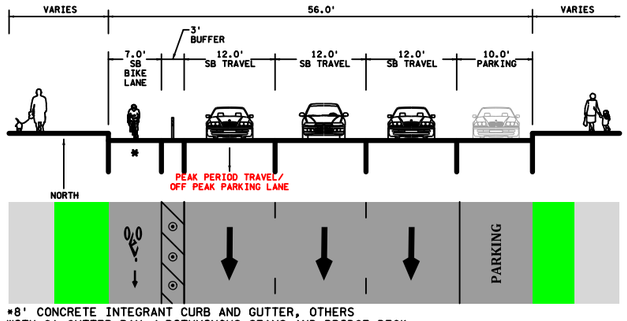
PARK AVE & PORTLAND AVE-CONCEPT DESIGN 8



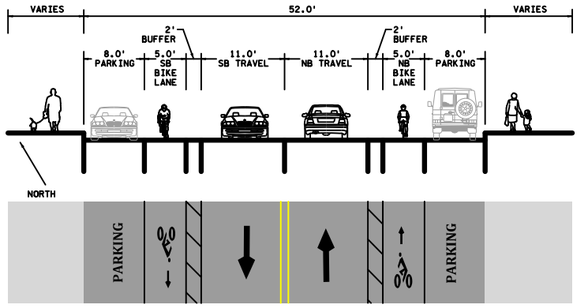
*8' CONCRETE INTEGRANT CURB AND GUTTER AND OTHERS
WITH 2' GUTTER PAN / BITUMINOUS SEAMS

B PORTLAND AVE - 46TH ST TO 31ST ST
& 29TH ST TO FRANKILIN AVE

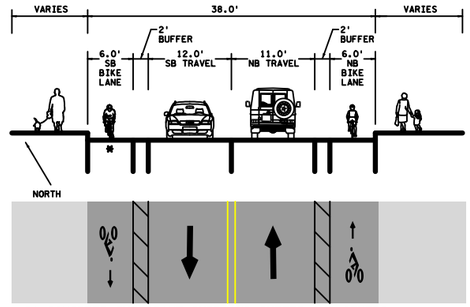


*8' CONCRETE INTEGRANT CURB AND GUTTER, OTHERS
WITH 2' GUTTER PAN / BITUMINOUS SEAMS AND BRIDGE DECK

C PORTLAND AVE - 31ST ST TO 29TH ST
& FRANKILIN AVE TO 6TH ST

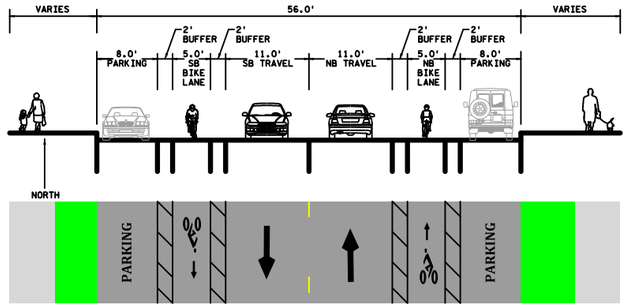


D1 PORTLAND AVE - WASHINGTON AVE TO 2ND ST

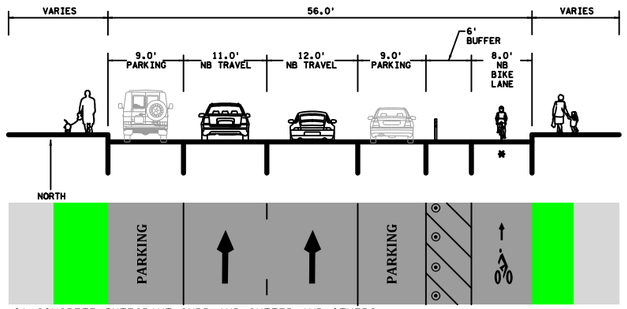


*8' CONCRETE INTEGRANT CURB AND GUTTER AND OTHERS
WITH 2' GUTTER PAN / BITUMINOUS SEAMS

D2 PORTLAND AVE - 2ND ST TO W RIVER PKWY

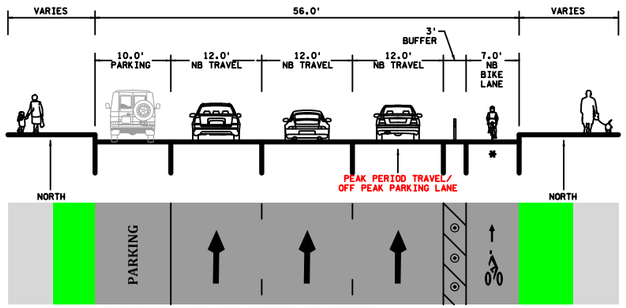


E PARK AVE - MINNEHAHA PKWY TO 46TH ST



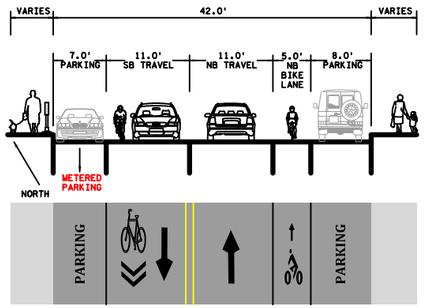
*8' CONCRETE INTEGRANT CURB AND GUTTER AND OTHERS
WITH 2' GUTTER PAN / BITUMINOUS SEAMS

F PARK AVE - 46TH ST TO 31ST ST &
28TH ST TO I-94 BRIDGE



*8' CONCRETE INTEGRANT CURB AND GUTTER AND OTHERS
WITH 2' GUTTER PAN / BITUMINOUS SEAMS

G PARK AVE - 31ST ST TO 28TH ST &
I-94 BRIDGE TO 5TH ST S



H PARK AVE - WASHINGTON AVE TO 2ND ST

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
PARK/PORTLAND
PRELIMINARY CONCEPT
CORRIDOR 8

FIGURE
A-8
2 OF 2

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1ST/BLAISDELL - CONCEPT DESIGN 9

BLAISDELL FROM 40TH ST TO 32ND - ONE-WAY PROTECTED BIKE LANE
1. REMOVE A TRAVEL LANE
2. A DESIGN EXCEPTION IS REQUIRED FOR SINGLE TRAVEL LANE.

BLAISDELL SIGNALIZED INTERSECTIONS
1. REMOVAL OF ~50' OF PARKING AT SIGNALS IS NEEDED TO PROVIDE DE FACTO LEFT TURN LANES.
2. RIGHT TURN MIXING LANES

COORDINATE WITH PROPOSED STREET CAR PLAN.

BLAISDELL FROM 31ST S TO 28TH ST - ONE-WAY PROTECTED BIKE LANE.

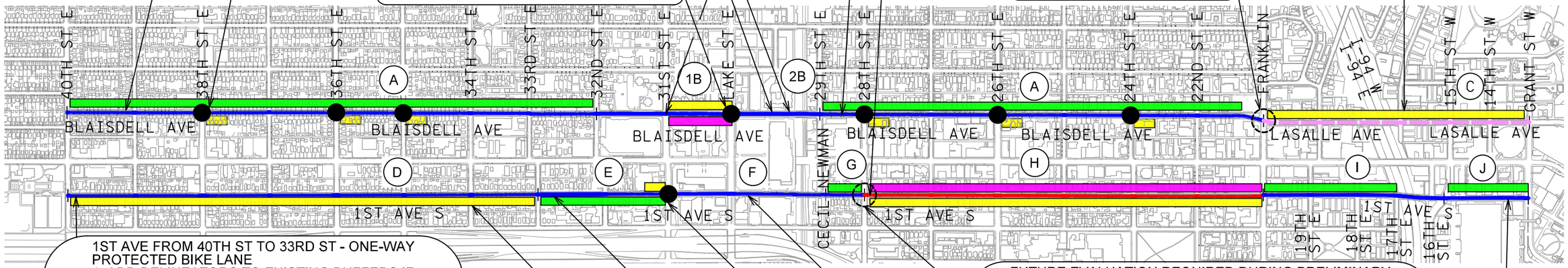
RIGHT TURN CONFLICT ZONE MARKINGS

LASALLE FROM FRANKLIN AVE TO GRANT AVE- TRAVEL LANE REMOVAL IS NOT FEASIBLE. FURTHER EVALUATION IS NEEDED:
1. PARKING REMOVAL SHOULD BE FURTHER INVESTIGATED.
2. ALTERNATIVE BIKE LANE DESIGN TREATMENTS SHOULD BE FURTHER EVALUATED.

BLAISDELL FROM 28TH ST TO FRANKLIN AVE - ONE-WAY PROTECTED BIKE LANE.
1. REMOVE A TRAVEL LANE
2. DESIGN EXCEPTION IS REQUIRED

1ST AVE FROM 28TH ST TO FRANKLIN AVE. CONSIDER TWO OPTIONS.
OPTION H1: MAINTAIN TWO-WAY STREET
1. STANDARD 6' BIKE LANE.
2. SWITCH PARKING TO THE WEST SIDE OF 1ST AVE.
OPTION H2: CONVERT TO ONE-WAY STREET
1. PROVIDE PROTECTED BIKE LANE.
2. SWITCH PARKING TO THE WEST SIDE OF 1ST AVE.
3. DESIGN EXCEPTION FOR SINGLE TRAVEL LANE.

LANE DROP CONSIDERATION



1ST AVE FROM 40TH ST TO 33RD ST - ONE-WAY PROTECTED BIKE LANE
1. ADD DELINEATORS TO EXISTING BUFFERS IF EXISTING PARKING IS REMOVED; OR IF EXISTING PARKING IS PERMITTED ON WEEKENDS IN BUFFERED BIKE LANES

FUTURE EVALUATION REQUIRED DURING PRELIMINARY ENGINEERING. CONSIDERATIONS INCLUDE:
1. HIGH RIGHT TURN CONFLICT
2. PARKING LANE ON WEST SIDE
3. LANE SHIFT AT CECIL NEWMAN

1ST AVE FROM 31ST S TO 28TH ST - ONE-WAY PROTECTED BIKE LANE
1. ADD DELINEATORS
2. MAINTAIN TWO TRAVEL LANES

REMOVAL OF ~50' OF PARKING AT SIGNALS IS NEEDED TO PROVIDE DE FACTO LEFT TURN LANES.

1ST AVE FROM FRANKLIN AVE TO GRANT AVE - ONE-WAY PROTECTED BIKE LANE
1. REMOVE OF A TRAVEL LANE BETWEEN FRANKLIN TO 17TH ST
2. REMOVE TRAVEL LANE BETWEEN 15TH ST TO GRANT.
3. DESIGN EXCEPTION IS REQUIRED FRANKLIN TO 19TH ST.

1ST AVE FROM 33RD ST TO 31ST - ONE-WAY PROTECTED BIKE LANE
1. REMOVE A TRAVEL LANE
2. A DESIGN EXCEPTION IS REQUIRED

INVESTIGATE FEASIBILITY FOR WEEKEND PARKING REMOVAL.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
1ST/BLAISDELL
PRELIMINARY CONCEPT
CORRIDOR 9

FIGURE A-9
1 OF 2

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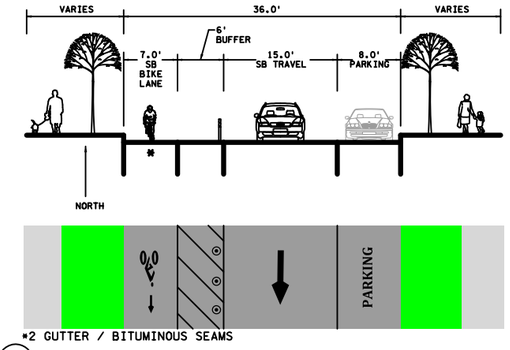
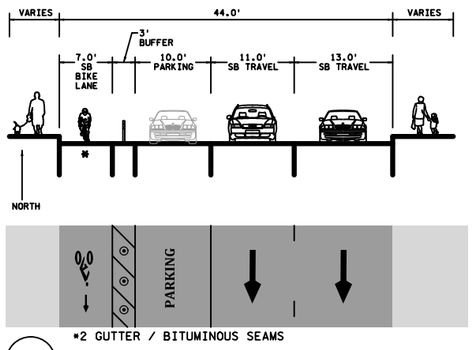
1ST/BLAISDELL - CONCEPT DESIGN 9



*2 GUTTER / BITUMINOUS SEAMS

A BLAISDELL AVE - FRANKLIN TO 29TH ST E AND 32ND ST E TO 40TH ST E

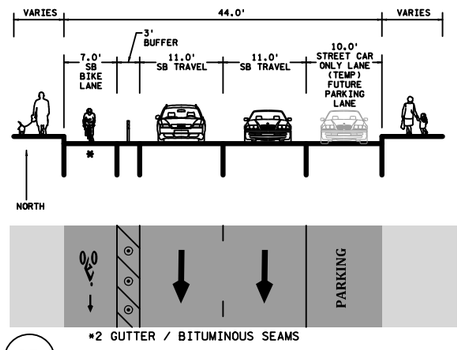
-DESIGN EXCEPTION REQUIRED



*2 GUTTER / BITUMINOUS SEAMS

1B BLAISDELL AVE - 32ND TO LAKE ST

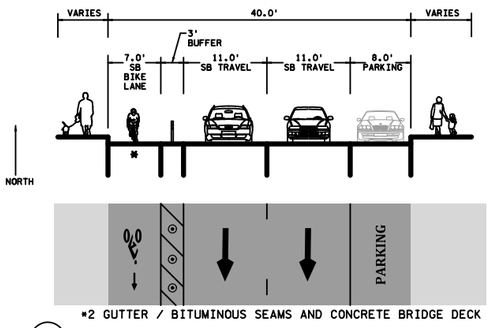
PARKING IS ON THE LEFT SIDE BETWEEN 31ST ST AND 32ND ST - CONSIDER MOVING PARKING FROM THE RIGHT SIDE TO LEFT SIDE BETWEEN LAKE ST AND 31ST ST



*2 GUTTER / BITUMINOUS SEAMS

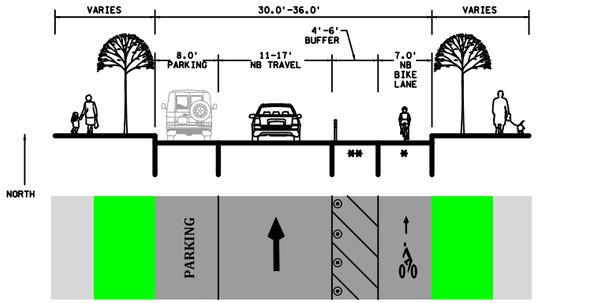
2B BLAISDELL AVE - LAKE ST TO 29TH ST

-DESIGN EXCEPTION REQUIRED



*2 GUTTER / BITUMINOUS SEAMS AND CONCRETE BRIDGE DECK

C BLAISDELL AVE - GRANT TO FRANKLIN

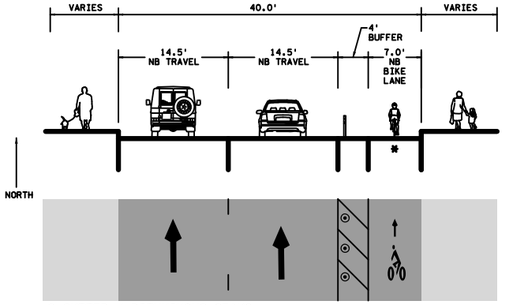


*2 GUTTER / BITUMINOUS SEAMS **ADD DELINATORS IF WEEKLY PARKING IS REMOVED

1ST AVE - GENERALIZED (40TH TO 31ST)

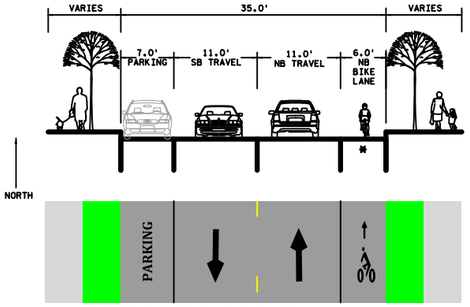
E D G *-PREEXISTING APPROVED DESIGN EXCEPTION FROM 40TH ST TO 33RD ST*

-REQUIRE DESIGN EXCEPTION FROM 33RD TO 31ST ST



*2 GUTTER / BITUMINOUS SEAMS

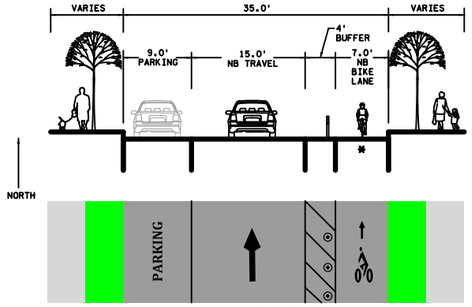
F 1ST AVE - 31ST TO CECIL NEWMAN



*2 GUTTER / BITUMINOUS SEAMS

H1 1ST AVE - 28TH TO FRANKLIN

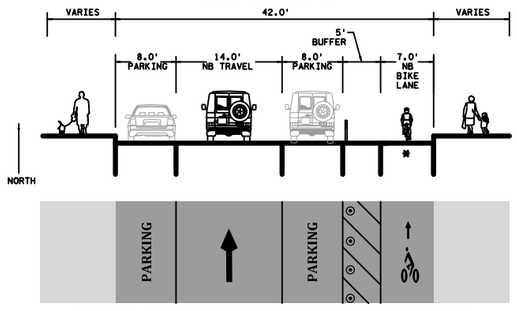
OR



*2 GUTTER / BITUMINOUS SEAMS

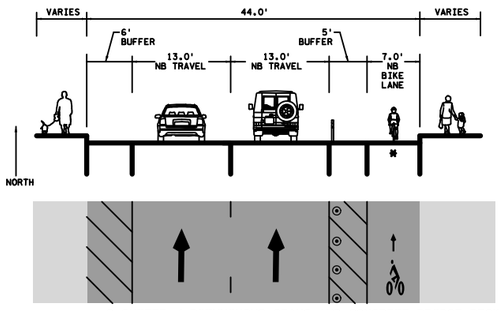
H2 1ST AVE - 28TH TO FRANKLIN

-DESIGN EXCEPTION REQUIRED



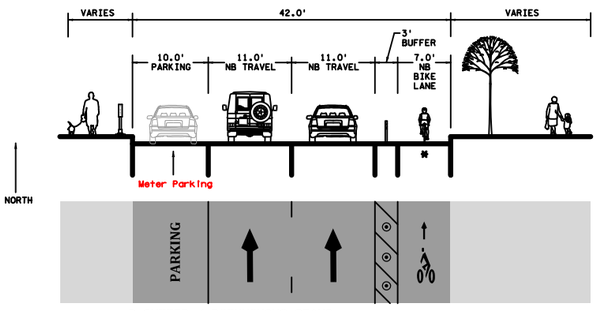
*2 GUTTER / BITUMINOUS SEAMS AND CONCRETE BRIDGE DECK

1I 1ST AVE - FRANKLIN TO 17TH



*2 GUTTER / BITUMINOUS SEAMS AND CONCRETE BRIDGE DECK

2I 1ST AVE - 17TH TO 15TH



*2 GUTTER / BITUMINOUS SEAMS

J 1ST AVE - 15TH TO GRANT

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
1ST/BLAISDELL
PRELIMINARY CONCEPT
CORRIDOR 9

FIGURE A-9
2 OF 2

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5TH &/OR 6TH ST S & 11TH AVE - CONCEPT DESIGN 10

LANES ARE TOO NARROW FOR SEPARATED ON-STREET BIKE FACILITIES. CONSIDERATIONS:
1. PROVIDE A SHARED BIKE LANE.
2. CREATE BIKEWAY WITH FUTURE CONSTRUCTION OF THESE SEGMENTS

HIGH PARKING RAMP ACCESS DEMAND. FUTURE EVALUATION OF THE BIKE AND TRAVEL LANES IS REQUIRED.

FUTURE EVALUATION IS NEEDED.
1. PEDESTRIAN PLAZA AREA. BETWEEN 3RD AVE AND 4TH AVE.
2. 4TH AVE TO 5TH AVE - WIDE SIDEWALK ON NORTH SIDE OF STREET.
3.EVALUATE POTENTIAL TRAIL CONNECTION AND LRT CROSSING FROM NORTH SIDE TO SOUTH SIDE OF TRACKS.

PARK AVE TO 4TH AVE AVE - PROVIDE A SHARED BIKE LANE FACILITY. CONSIDERATIONS:
1. CITY IS CURRENTLY EXPLORING AN OFF STREET TRAIL ON NORTHSIDE OF 5TH ST.
2. COORDINATE WITH STAR TRIBUNE PROPERTY PROPOSED REDEVELOPMENT PLANS
3. 2' GUTTER PAN WITH BIT SEAM AND TOO NARROW OF TRAVEL LANE TO A FIT BIKE LANE.

ONE-WAY EASTBOUND OFF-STREET TRAIL IS BEING CONSTRUCTED WITH THE STADIUM ON 6TH ST.

1. HIGH RIGHT TURN CONFLICT AT WASHINGTON. PROVIDE MIXINGS ZONE AND CONFLICT ZONE LANE MARKINGS.
2. MAINTAIN NORTHBOUND AND SOUTHBOUND LEFT TURN LANES.

MEDIAN AT LRT CROSSING AND HIAWATHA TRAIL CROSSING. REMOVE BUFFER WIDTH AND MAINTAIN SIGHT LINES.

FUTURE CLOSURE OF 5TH ST. DEVELOP MULTIUSE TRAIL AND CONNECTION TO HIAWATHA TRAIL.

11TH AVE SIGNAL - TRANSITION FROM OFF-STREET TRAIL TO ONE-WAY PROTECTED BIKE LANES

LEFT TURN CONFLICT ZONE MARKINGS

MAINTAIN CITY CENTER LOADING ZONE\PARKING ON SOUTH SIDE OF 6TH ST.

EVALUATE POTENTIAL TO CLOSE TRAVEL LANE AND PROVIDE A BIKE/PEDESTRIAN ONLY CONNECTION.

TWO-WAY TRAIL IS BEING CONSTRUCTED WITH THE STADUIM ON 5TH AND 6TH ST S.

CHICAGO AVE SIGNAL - TRAIL CROSSING ON THE NORTH LEG. INCORPORATED IN STADIUM SITE PLAN.

HENNEPIN AVE TO PARK AVE - TWO OPTIONS ARE FEASIBLE AND REQUIRE FURTHER DISCUSSION WITH STAKE HOLDERS.

OPTION A1 IS A ONE-WAY PROTECTED FACILITY ON THE LEFT SIDE OF THE ROAD. CONSIDERATIONS:
1. ON-STREET PARKING AND LOADING WILL BE MAINTAINED.
2. PARKING RAMP ACCESSES.
3. 2' GUTTER PAN WITH BIT SEAM.

OPTION A2 IS A TWO-WAY BIKE FACILITY ON THE LEFT SIDE OF THE ROAD. CONSIDERATIONS:
1. PEAK PERIOD PARKING RESTRICTIONS ON ONE SIDE STREET WILL BE NECESSARY EXCEPT FULL TIME REMOVAL ON NORTH SIDE BETWEEN HENNEPIN AVE AND NICOLLET AVE IS NEEDED.
2. PARKING RAMP ACCESSES.
3. 2' GUTTER PAN WITH BIT SEAM.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
5TH &/OR 6TH ST S & 11TH AVE
PRELIMINARY CONCEPT
CORRIDOR 10

FIGURE A-10
1 OF 2

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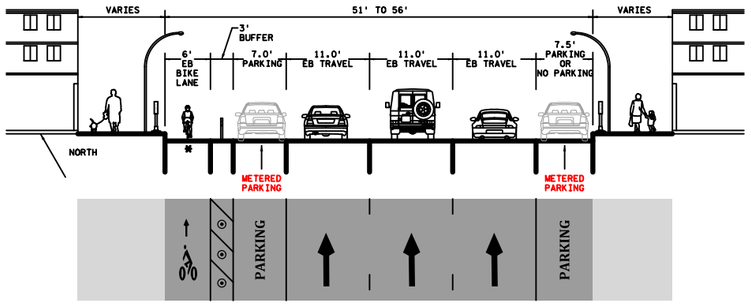
5TH &/OR 6TH ST S & 11TH AVE - CONCEPT DESIGN 10

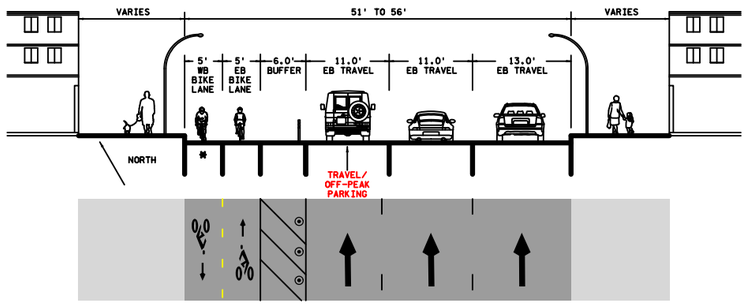


*2' GUTTER PAN / BITUMINOUS AND OTHERS WITH 8' CONCRETE INTEGRANT CURB AND GUTTER (POOR CONDITION)

(A1) 6TH ST - HENNEPIN AVE TO 4TH AVE S

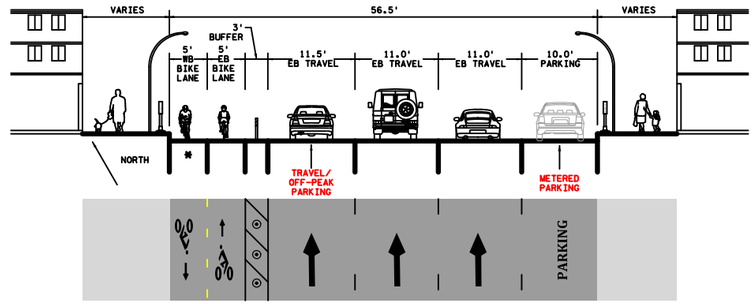
(B1) 6TH ST - 4TH AVE S TO PARK AVE

-BIKE/BUFFER WIDTH LESS THAN 10'



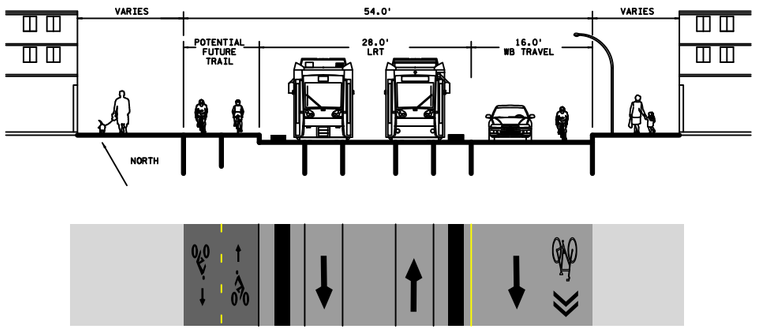
*2' GUTTER PAN / BITUMINOUS AND OTHERS WITH 8' CONCRETE INTEGRANT CURB AND GUTTER (POOR CONDITION)

(A2) 6TH ST - HENNEPIN AVE TO 4TH AVE S

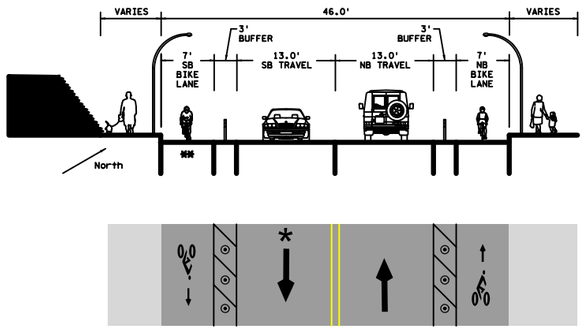


*2' GUTTER PAN / BITUMINOUS AND OTHERS WITH 8' CONCRETE INTEGRANT CURB AND GUTTER (POOR CONDITION)

(B2) 6TH ST - 4TH AVE S TO PARK AVE



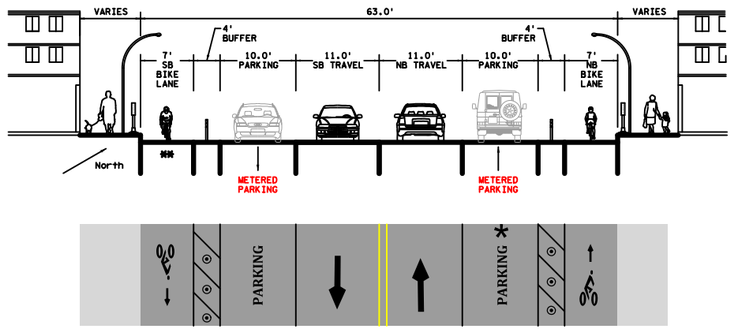
(D) 5TH ST - 5TH AVE S TO PARK AVE S



**2' GUTTER PAN / BITUMINOUS SEAM

(F) 11TH AVE - 6TH ST S TO 3RD ST S

* PROTECTED BIKE LANES WILL NOT FIT IN THE EXISTING 3-LANE CROSS-SECTION. REDUCTION TO ONE SOUTHBOUND LANE CAN OCCUR WHEN THE NEW 7TH ST/94 RAMP CONNECTION IS COMPLETED.



**2' GUTTER PAN / BITUMINOUS SEAM

(G) 11TH AVE - 3RD ST S TO W. RIVER PARKWAY

*PARKING REMOVAL ON ONE SIDE IS REQUIRED BETWEEN 2ND ST AND W. RIVER PARKWAY (53' STREET WIDTH).

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PRELIMINARY CONCEPT
CORRIDOR 10

FIGURE A-10
2 OF 2

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7TH ST N & 9TH/10TH ST S - CONCEPT DESIGN 11

EXISTING 6' INTEGRANT GUTTER PAN ON EACH SIDE

BRYANT AVE N TO OLSON MEMORIAL HWY- ONE-WAY PROTECTED BIKEWAY IS FEASIBLE THROUGH NARROWING LANES. CONSIDERATIONS:
1. INVESTIGATE COST AND FEASIBILITY TO NARROW MEDIAN TO PROVIDE ADDITIONAL BIKE LANE/BUFFER WIDTH FOR ONE-WAY PROTECTED BIKE LANES. SWLRT FUNDING COULD BE AVAILABLE.
2. FOR INTERIM CONDITIONS THE SHOULDERS COULD BE REMOVED AND THE TRAVEL LANES BE NARROWED.

FURTHER EVALUATION IS NEEDED DURING PRELIMINARY ENGINEERING:
1. PORK CHOP RIGHT TURN DESIGN CONSIDERATIONS (HIGHER VOLUME AND VEHICLE SPEEDS)
2. APPROACH WIDTHS AT THE SIGNALS MAY REQUIRE NARROW BUFFER WIDTH OR DROPPING PROTECTED LANES

MAY NEED TO SHIFT PAINTED MEDIAN TO THE SOUTH. EVALUATE AND NARROW PAINTED MEDIAN TO THE EXTENT FEASIBLE.

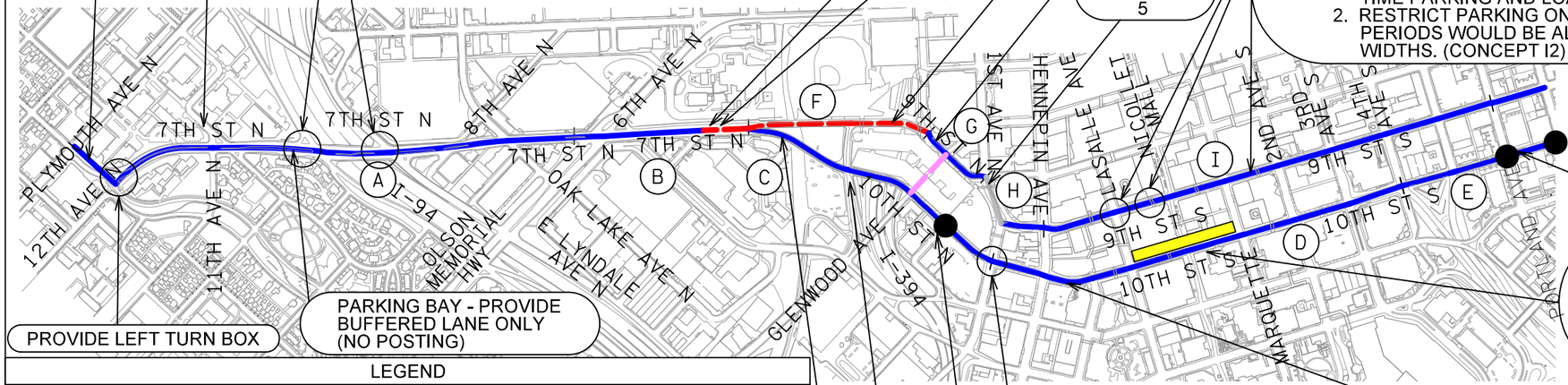
CHARTER BUS & TAXI PARKING DURING EVENTS - CONSIDER BUFFER LANE ONLY (WB)

9TH ST. (HAWTHORNE AVE TO 7TH STREET) - A ONE-WAY OR TWO-WAY PROTECTED BIKE LANE IS FEASIBLE. CONSIDERATIONS:
1. THIS SEGMENT IS BEING RECONSTRUCTED WITH TARGET CENTER RENOVATION. THE CITY SHOULD DETERMINE THE APPROPRIATE CONFIGURATION AT THAT TIME.
2. A TWO-WAY BIKE FACILITY ON THIS SEGMENT MAY GIVE A MORE DIRECT CONNECTION INTO DOWNTOWN FOR BICYCLIST ON 2ND AVE OR COMING FROM TARGET FIELD.
3. 7TH ST N/2ND AVE N TWO-WAY SIGNAL AT INTERSECTION IS COMPLEX

HIGH VOLUME PARKING RAMP ACCESS AND LEFT TURN CONFLICT AT LASALLE AVE

9TH ST- A ONE-WAY PROTECTED BIKE LANE IS FEASIBLE. FURTHER EVALUATION MAY BE NECESSARY TO DETERMINE PREFERRED CONCEPT. CONSIDERATIONS INCLUDE:
1. PROVIDE PROTECTED BIKE LANE WITH NARROW LANES TO MAINTAIN FULL TIME PARKING AND LOADING. (CONCEPT I1); OR
2. RESTRICT PARKING ON THE SOUTH SIDE DURING PEAK PERIODS (OFF PEAK PERIODS WOULD BE ALLOWED) TO PROVIDE MORE COMFORTABLE LANE WIDTHS. (CONCEPT I2)

SEE CORRIDOR 5



PROVIDE LEFT TURN BOX

PARKING BAY - PROVIDE BUFFERED LANE ONLY (NO POSTING)

TRANSITION TO PORTLAND AND PARK AVE VIA A TURN BOX

LASALLE AVE TO MARQUETTE AVE. PARKING AND LOADING IS ON BOTH SIDES OF 10TH. CONSIDERATIONS:
1. PROVIDE BUFFERED BIKE LANE TO MAINTAIN LOADING AND PARKING.
2. RESTRICT PARKING DURING AM/PM PEAK PERIODS (ALLOW PARKING/LOADING DURING OFF PEAK)

HIGH USE TAXI CAB STAND ON NW CORNER

10TH STREET - ONE-WAY PROTECTED BIKEWAY IS FEASIBLE THROUGH LANE NARROWING

10TH ST/CURRIE AVE INTERSECTION- POTENTIAL LOCATION TO PROVIDE EXCLUSIVE BIKE PHASE TO FACILITATE SHIFTING BIKE LANE FROM RIGHT SIDE TO LEFT SIDE.

CONSIDER PROVIDING A BIKE LANE CONNECTION ON GLENWOOD AVE. BETWEEN 10TH ST AND 9TH ST

7TH/10TH ST SPLIT TO GLENWOOD - ONE-WAY PROTECTED LANE IS FEASIBLE. CONSIDERATIONS:
1. FURTHER INVESTIGATION IS NEEDED TO DETERMINE WHICH SIDE THE BIKE LANE SHOULD BE ON DUE TO BUS STOPS AND TAXI AREAS.
2. DETERMINE BEST OPTION AND LOCATION TO SHIFT BIKES FROM RIGHT SIDE OF 10TH ST TO THE LEFT SIDE.
3. A DESIGN EXCEPTION MAY BE NEEDED FOR SEGMENT C BETWEEN GLENWOOD AND HAWTHORNE; OR PROVIDE A STANDARD BIKE LANE ON THIS SEGMENT.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
7TH ST N & 9TH/10TH ST S
PRELIMINARY CONCEPT
CORRIDOR 11

FIGURE A-11
1 OF 2

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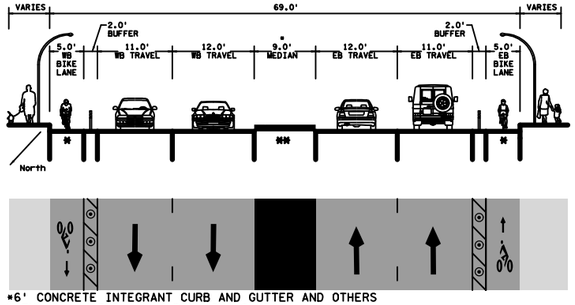
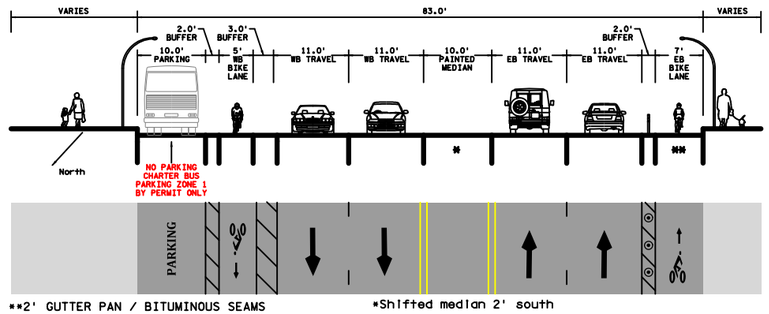
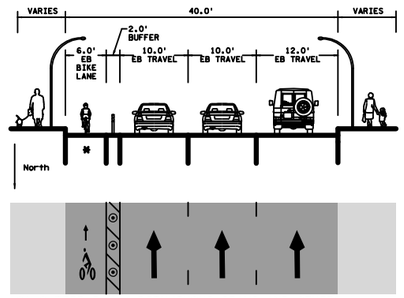
7TH ST N & 9TH/10TH ST S - CONCEPT DESIGN 11



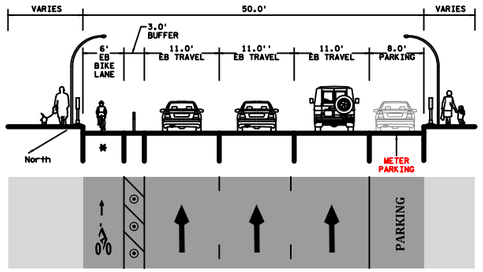
(A) 7TH ST N - 12TH AVE N TO OLSON MEMORIAL HWY/6TH AVE N
-BIKE/BUFFER WIDTHS LESS THAN 10'



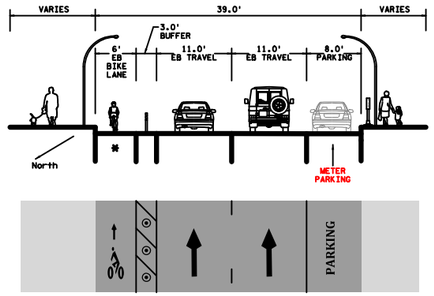
(B) 7TH ST N - OLSON MEMORIAL HWY TO 9TH/10TH ST N SPLIT
-BIKE/BUFFER WIDTHS LESS THAN 10'



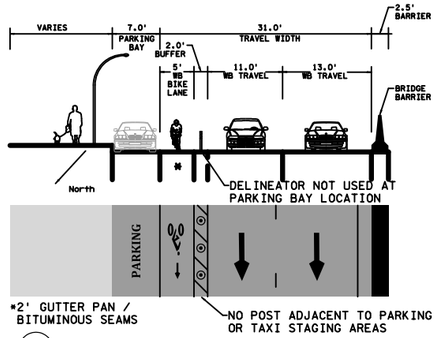
(C) 10TH ST - GLENWOOD TO HAWTHORNE
-DESIGN EXCEPTION REQUIRED
-BIKE/BUFFER WIDTHS LESS THAN 10'



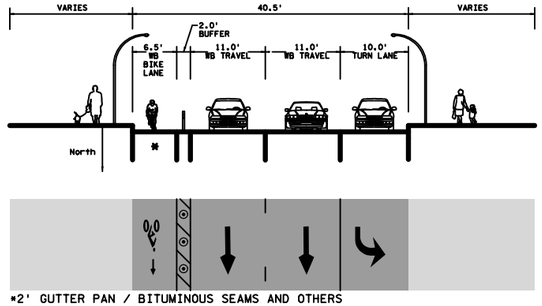
(D) 10TH ST - HAWTHORNE AVE N TO 4TH AVE S
-BIKE/BUFFER WIDTHS LESS THAN 10'



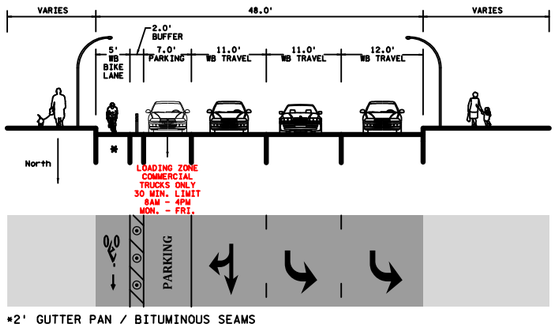
(E) 10TH ST - 4TH AVE S TO PARK AVE
-BIKE/BUFFER WIDTHS LESS THAN 10'



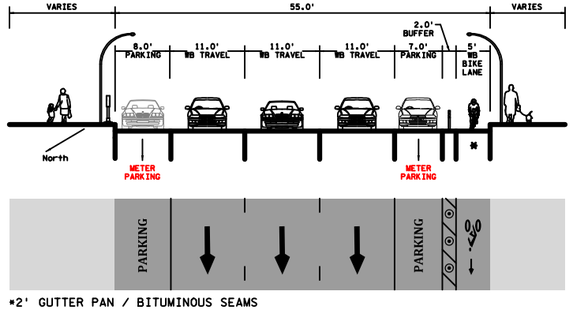
(F) 7TH/10TH ST N SPLIT TO 2ND AVE N
-BIKE/BUFFER WIDTHS LESS THAN 10'



(G) 7TH ST N - 2ND AVE N TO 1ST AVE N
-BIKE/BUFFER WIDTHS LESS THAN 10'

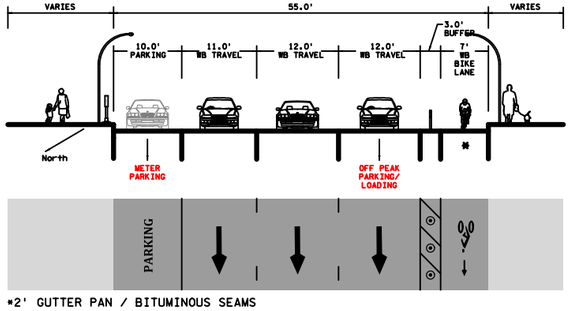


(H) 9TH ST - 1ST AVE N TO HENNEPIN AVE
-BIKE/BUFFER WIDTHS LESS THAN 10'



(I1) 9TH ST - HENNEPIN AVE TO PARK AVE
-BIKE/BUFFER WIDTHS LESS THAN 10'

OR



(I2) 9TH ST - HENNEPIN AVE TO PARK AVE
-BIKE/BUFFER WIDTHS LESS THAN 10'

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
7TH ST N & 9TH/10TH ST S
PRELIMINARY CONCEPT
CORRIDOR 11

FIGURE A-11
2 OF 2

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4TH ST SE/UNIVERSITY AVE SE & OAK ST - CONCEPT DESIGN 12

OAK ST TO EAST RIVER-PKWY TWO-WAY PROTECTED BIKE LANE FACILITY. (CITY PREFERRED CONCEPT)

FURTHER EVALUATION AT THE BUMP OUTS AND TRANSIT STOP (NW CORNER) IS NEEDED.

FILL IN BIKE LANE GAP BETWEEN 13TH AVE AND 15TH AVE.
1. REMOVE PARKING ON NORTH SIDE OF 4TH ST.
2. PROVIDE STANDARD BIKE LANE.

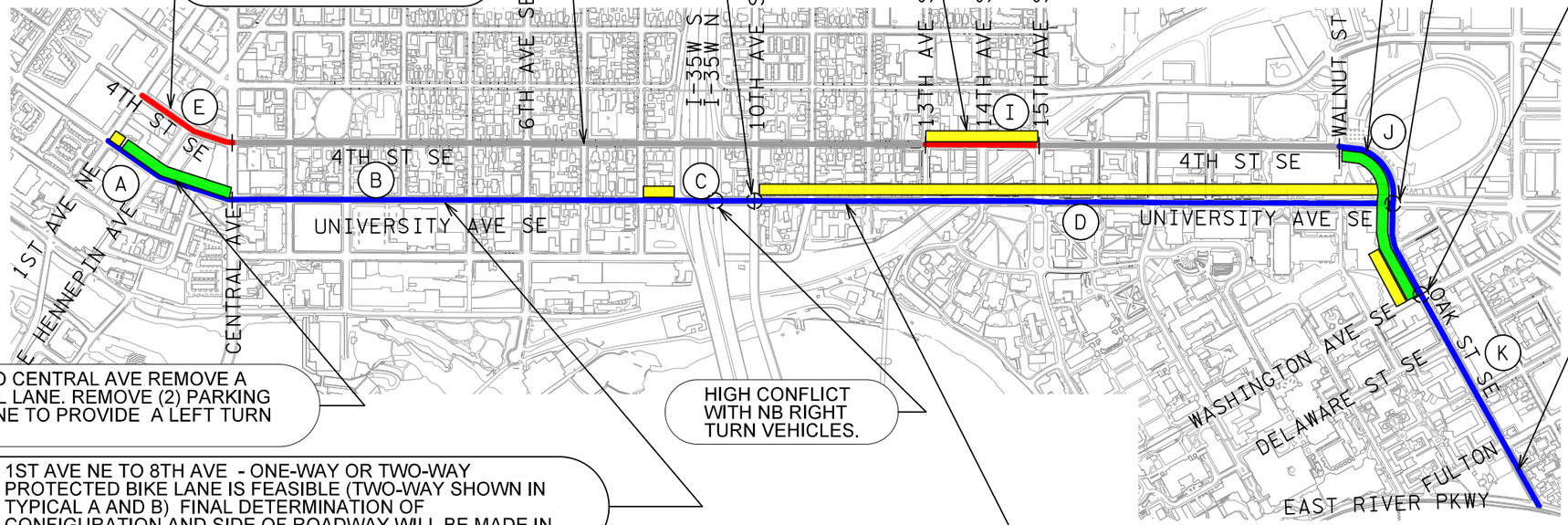
MEDIAN MAY NEED TO BE REMOVED TO DEVELOP AN EXCLUSIVE EB LEFT TURN LANE, AND MAINTAIN (2) EASTBOUND TRAVEL LANES

REMOVE EB LEFT TURN LANE

MAINTAIN EXISTING STANDARD BIKE LANE FROM WALNUT ST TO 15TH AVE AND 13TH AVE TO CENTRAL AVE. (NOTE: A PROTECTED BIKE LANE ON 4TH STREET WEST OF 35W IS FEASIABLE WITH A TRAVEL LANE REMOVED)

OAK TO WALNUT-TWO-WAY PROTECTED BIKE LANE IS FEASIBLE.
CONSIDERATIONS:
1. TRANSITION AT OAK ST
2. TRANSITION AT WALNUT ST

PROVIDE STANDARD BIKE LANE BETWEEN CENTRAL AVE AND 1ST AVE.



FROM 1ST AVE NE TO CENTRAL AVE REMOVE A WESTBOUND TRAVEL LANE. REMOVE (2) PARKING STALLS AT 1ST AVE NE TO PROVIDE A LEFT TURN BYPASS AREA.

HIGH CONFLICT WITH NB RIGHT TURN VEHICLES.

1ST AVE NE TO 8TH AVE - ONE-WAY OR TWO-WAY PROTECTED BIKE LANE IS FEASIBLE (TWO-WAY SHOWN IN TYPICAL A AND B) FINAL DETERMINATION OF CONFIGURATION AND SIDE OF ROADWAY WILL BE MADE IN CONTEXT WITH THE OVERALL UNIVERSITY AVE DESIGN.

10TH AVE SE TO OAK ST - TWO WAY PROTECTED BIKE FACILITY IS FEASIBLE. TWO OPTIONS REQUIRE FURTHER EVALUATION AND DISCUSSION WITH STAKEHOLDERS:
D1: REMOVE WEEKEND PARKING AND METERED PARKING BY 13TH AVE AND REMOVE A TRAVEL LANE. (TRAFFIC CONGESTION MAY ALSO RESULT FROM THIS OPTION). FURTHER TRAFFIC ANALYSIS IS NEEDED.
D2: NARROW TRAVEL LANES AND PURSUE A DESIGN EXCEPTION. FURTHER EVALUATION AND DISCUSSION WITH STAKEHOLDERS IS NECESSARY TO DETERMINE WHICH SIDE OF UNIVERSITY AVE IS PREFERED AND WHICH ALTERNATIVE D1 OR D2 IS PREFERRED.

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

N

0 500 1000
HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
4TH/UNIVERSITY & OAK ST
PRELIMINARY CONCEPT
CORRIDOR 12

FIGURE A-12
1 OF 2

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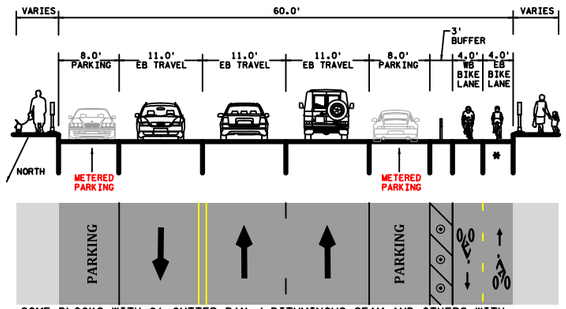
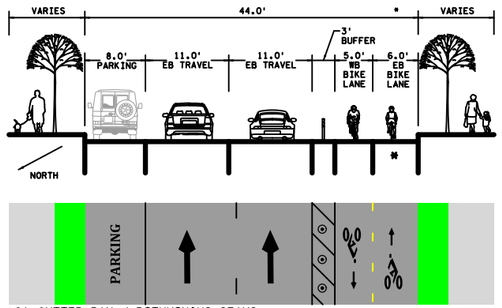
4TH ST SE/UNIVERSITY AVE SE & OAK ST - CONCEPT DESIGN 12



*SOME BLOCKS WITH 2' GUTTER PAN / BITUMINOUS SEAM AND OTHERS WITH 6' INTEGRANT CURB

(A) UNIVERSITY AVE - 1ST AVE NE TO CENTRAL AVE

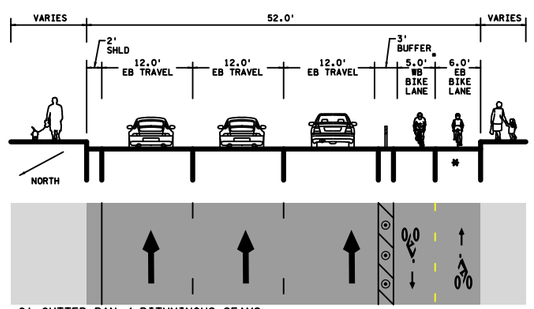
NOTE: A ONE-WAY PROTECTED BIKE LANE IS FEASIBLE. A LANE REMOVAL IS STILL NECESSARY



*2' GUTTER PAN / BITUMINOUS SEAMS

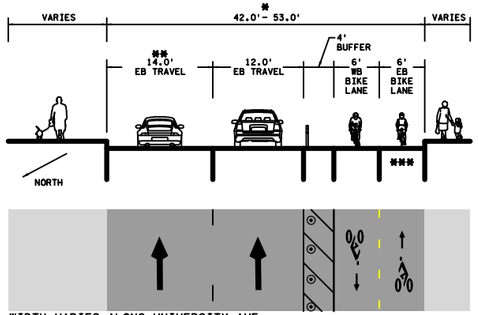
(B) UNIVERSITY AVE - CENTRAL AVE TO 8TH AVE

NOTE: A ONE-WAY PROTECTED BIKE LANE IS FEASIBLE.



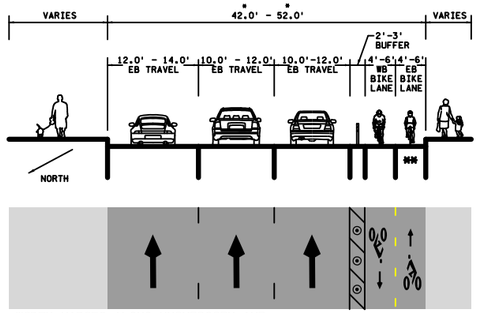
*2' GUTTER PAN / BITUMINOUS SEAMS

(C) UNIVERSITY AVE - 8TH AVE TO 10TH AVE



*WIDTH VARIES ALONG UNIVERSITY AVE
** COULD ADD ON-STREET PARKING 10 TH 52' WIDE BLOCKS-13TH AVE TO 15TH AVE
***2' GUTTER PAN / BITUMINOUS SEAMs

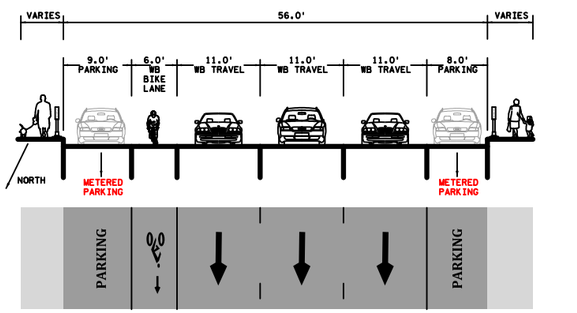
(D1) UNIVERSITY AVE - 10TH AVE TO OAK ST



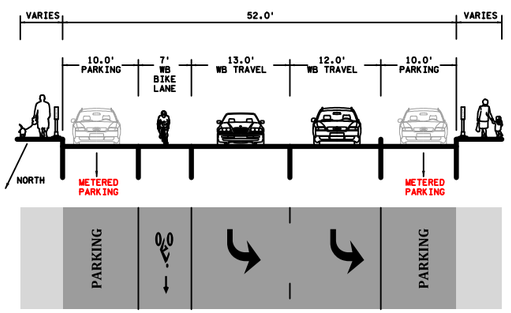
*WIDTH VARIES ALONG UNIVERSITY AVE
** 6' GUTTER PAN FOR BIKE LANE.
(MAY REQUIRE REPLACE CONCRETE PANELS WIDTH 8')

(D2) UNIVERSITY AVE - 10TH AVE TO OAK ST

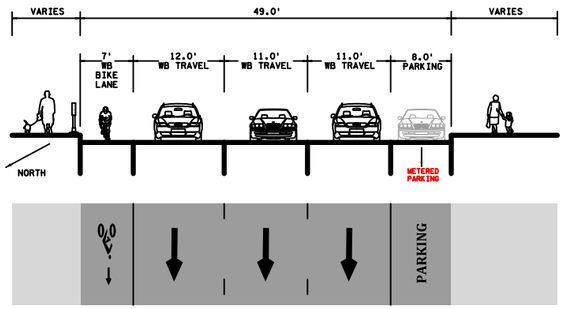
-DESIGN EXCEPTION REQUIRED ON 42 FOOT WIDE BLOCKS 42' SECTION IS LOCATED BETWEEN 15TH AVE TO 16TH AVE AND 17TH AVE TO 18TH AVE



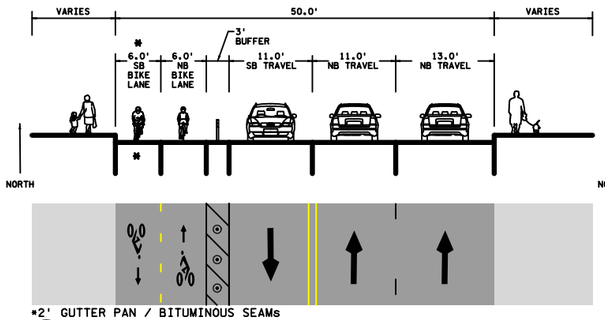
(E) 4TH STREET - CENTRAL AVE TO HENNEPIN AVE



(E) 4TH STREET - HENNEPIN AVE TO 1ST AVE

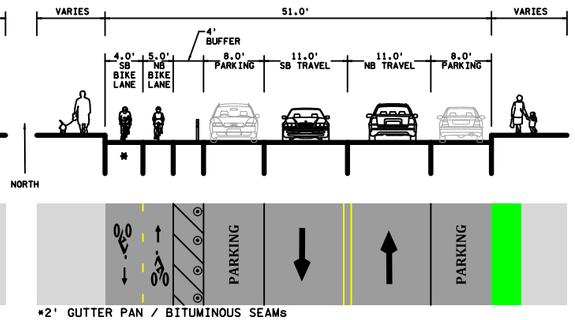


(I) 4TH STREET - 15TH AVE TO 13TH AVE



*2' GUTTER PAN / BITUMINOUS SEAMs

(J) OAK STREET - WASHINGTON AVE SE TO WALNUT ST



*2' GUTTER PAN / BITUMINOUS SEAMs

(K) OAK STREET - EAST RIVER PARKWAY TO WASHINGTON AVE SE

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
4TH/UNIVERSITY & OAK ST
PRELIMINARY CONCEPT
CORRIDOR 12

FIGURE A-12
2 OF 2

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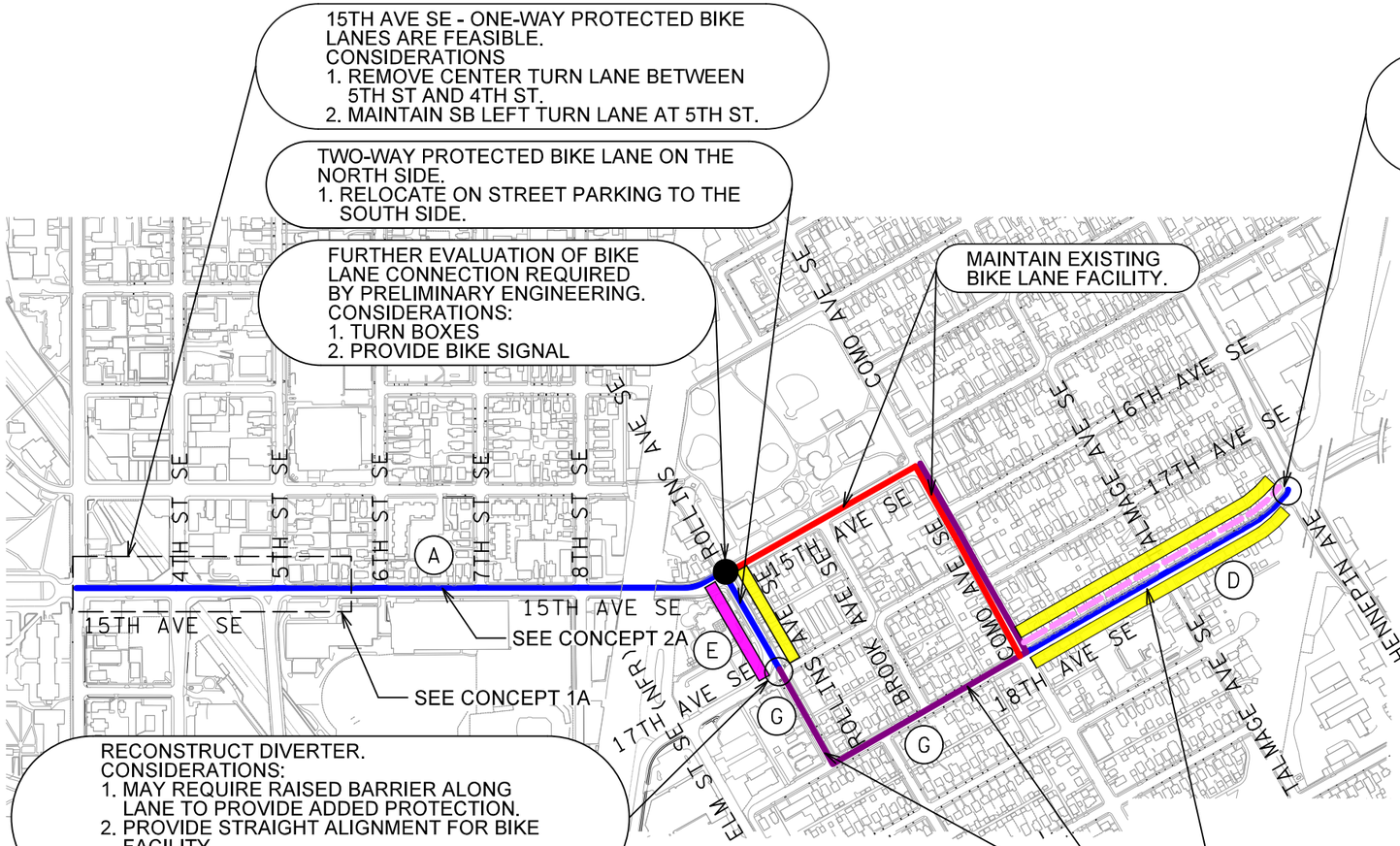
15TH ST SE TO NE DIAGONAL - CONCEPT DESIGN 13



NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

N

0 300 600
HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
15TH ST SE TO NE DIAGONAL
PRELIMINARY CONCEPT
CORRIDOR 13

FIGURE A-13
1 OF 2

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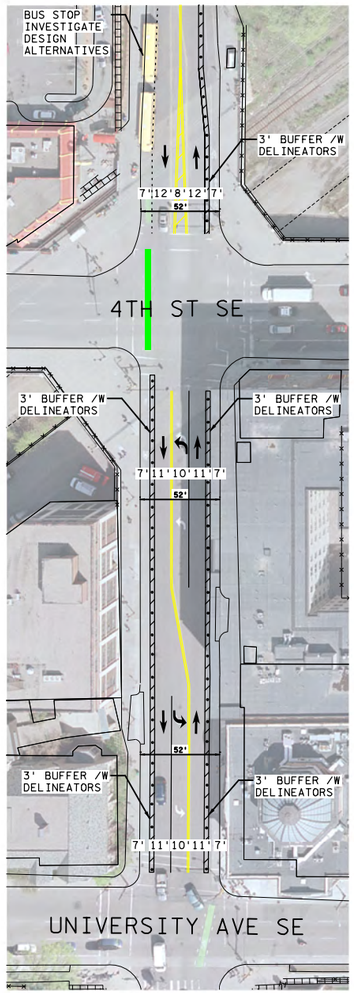
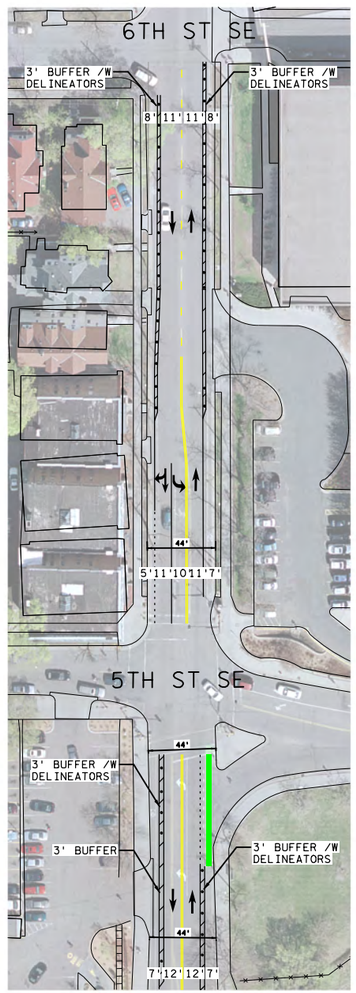
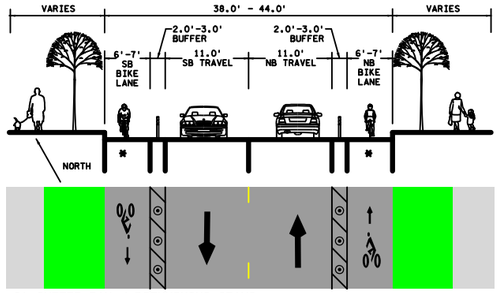
15TH ST SE TO NE DIAGONAL - CONCEPT DESIGN 13



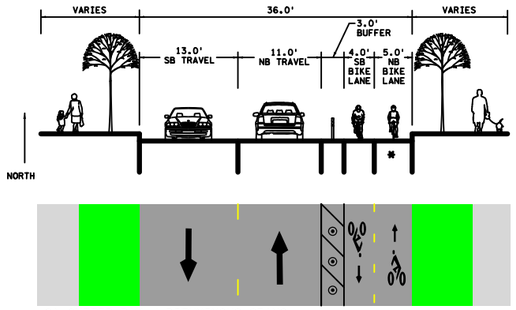


1A 15TH AVE SE - UNIVERSITY AVE TO 6TH ST SE



*2' GUTTER PAN / BITUMINOUS SEAMS

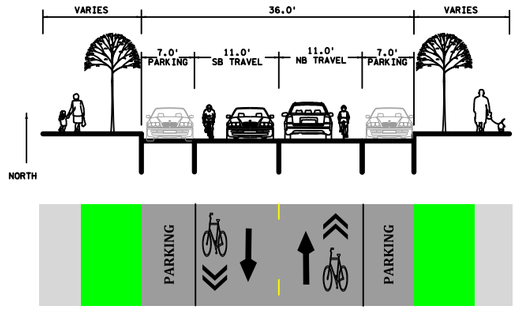
2A 15TH AVE SE - 6TH ST SE TO ROLLINS AVE



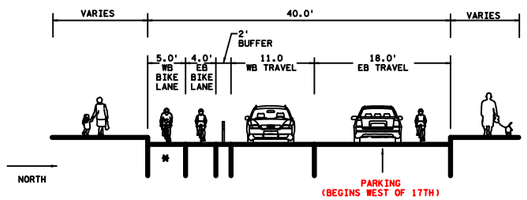
*2' GUTTER PAN / BITUMINOUS SEAMS

D1 18TH AVE SE - COME AVE SE TO E HENNEPIN AVE

OR

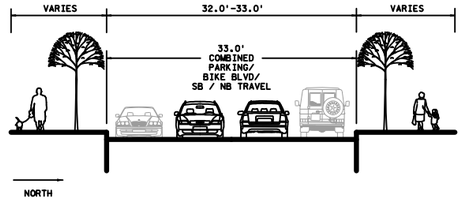


D2 18TH AVE SE - COME AVE SE TO E HENNEPIN AVE
-MAY REQUIRE A DESIGN EXCEPTION



*2' GUTTER PAN / BITUMINOUS SEAMS

E ROLLINS AVE - 15TH AVE SE TO 17TH AVE SE



*2' GUTTER PAN / BITUMINOUS SEAMS

G ROLLINS AVE - 17TH AVE SE TO 18TH AVE ST
18TH AVE SE - ROLLINS AVE SE TO COMO AVE SE

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
15TH ST SE TO NE DIAGONAL
PRELIMINARY CONCEPT
CORRIDOR 13

FIGURE A-13
2 OF 2

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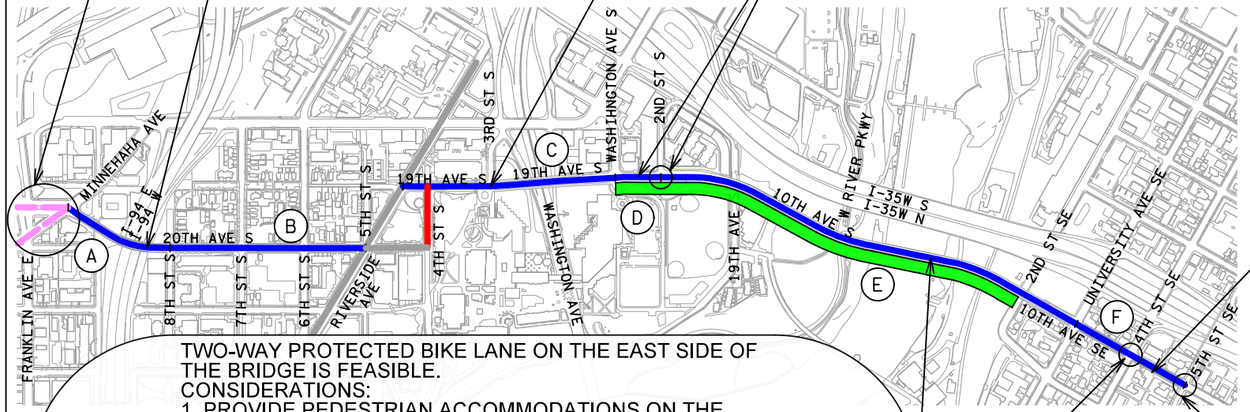
10TH/19TH/20TH AVE S - CONCEPT DESIGN 14

A CONNECTION TO FRANKLIN AVE AND MINNEHAHA AVE REQUIRES FURTHER EVALUATION.

20TH AVE - MINNEHAHA AVE TO RIVERSIDE AVE ONE-WAY PROTECTED BIKE LANES THROUGH NARROWING TRAVEL LANES IS FEASIBLE.

19TH AVE - RIVERSIDE AVE TO WASHINGTON AVE TWO-WAY PROTECTED BIKE LANE ON THE EAST SIDE IS FEASIBLE THROUGH LANE NARROWING.
CONSIDERATIONS:
1. MAINTAIN NB LEFT TURN LANE AT WASHINGTON AVE.
2. REMOVE THE NB RIGHT TURN LANE.

DESIGN CONSIDERATIONS:
1. MAINTAIN EXISTING MEDIAN LOCATION.
2. REMOVE NORTHBOUND RIGHT TURN LANE.
3. TRANSIT STOP.

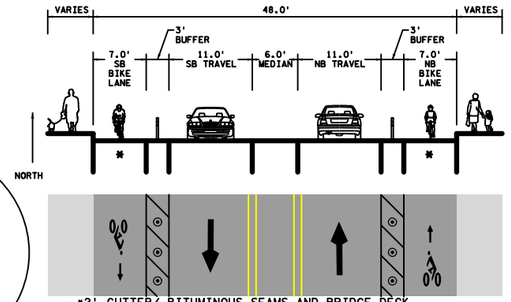


TWO-WAY PROTECTED BIKE LANE ON THE EAST SIDE OF THE BRIDGE IS FEASIBLE.
CONSIDERATIONS:
1. PROVIDE PEDESTRIAN ACCOMMODATIONS ON THE EAST SIDE ONLY TO REDUCE MAINTENANCE AND DRAINAGE CONCERNS WITH PROVIDING WALKWAY ON WEST SIDE OF BRIDGE.
2. COULD PROVIDE (2) NB TRAVEL LANES IF NEEDED BY NOT PROVIDING WALK WAY ON WESTSIDE.
3. DRAINAGE CONSIDERATIONS WITH PROVIDING CONTINUOS BARRIER AND THE RECESSED INLETS BEING LOCATED IN THE BIKE LANE. LIKELY CANNOT PROVIDE BARRIER ON BOTH THE WEST SIDE AND EAST DUE TO LOCATION OF INLETS.

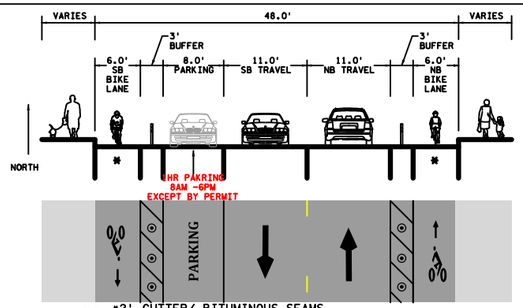
DESIGN CONSIDERATIONS:
1. TRANSITION BETWEEN TWO-WAY BIKEWAY ON UNIVERSITY AVE REQUIRES FURTHER EVALUATION.
2. AN EXCLUSIVE BIKE SIGNAL PHASE IS NOT FEASIBLE.
3. HIGH VOLUME RIGHT TURN CONFLICTS.

NOTE:

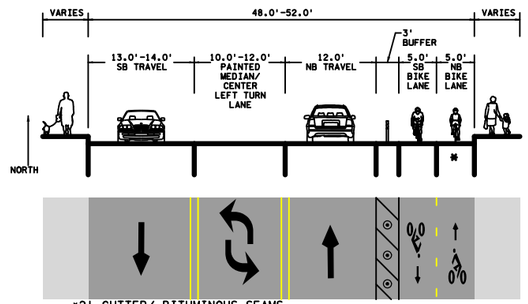
1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.



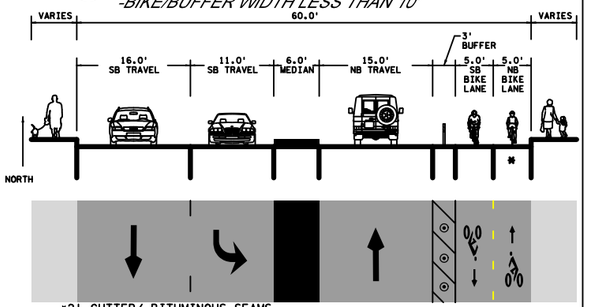
A MINNEHAHA AVE TO 8TH ST S



B 8TH ST S TO RIVERSIDE AVE
-BIKE/BUFFER WIDTH LESS THAN 10'



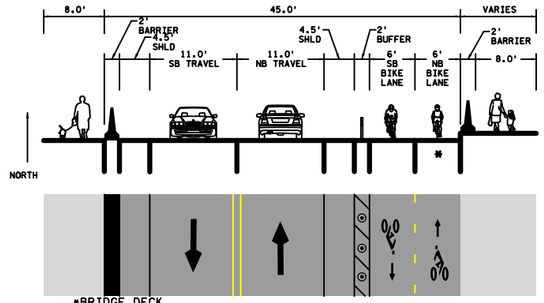
C RIVERSIDE AVE TO WASHINGTON AVE



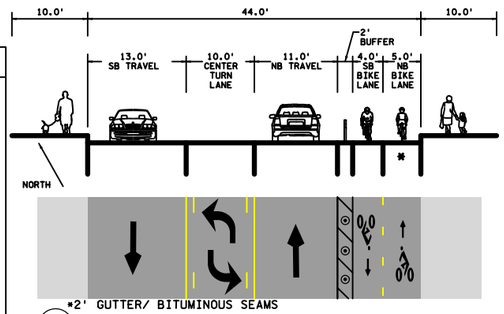
D WASHINGTON AVE TO 2ND ST S

10TH AVE - UNIVERSITY TO 5TH ST
A TWO-WAY PROTECTED BIKEWAY MAY BE FEASIBLE.
1. THE CITY MAY CONSIDER STOPPING THE PROTECTED FACILITY AT UNIVERSITY AVE.

TRANSITION TO ONE-WAY BIKE LANE REQUIRES FURTHER EVALUATION.



E 2ND ST S TO UNIVERSITY AVE (BRIDGE)



F UNIVERSITY AVE TO 5TH ST SE

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

N

0 500 1000
HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
10TH/19TH/20TH AVE S
PRELIMINARY CONCEPT
CORRIDOR 14

FIGURE A-14

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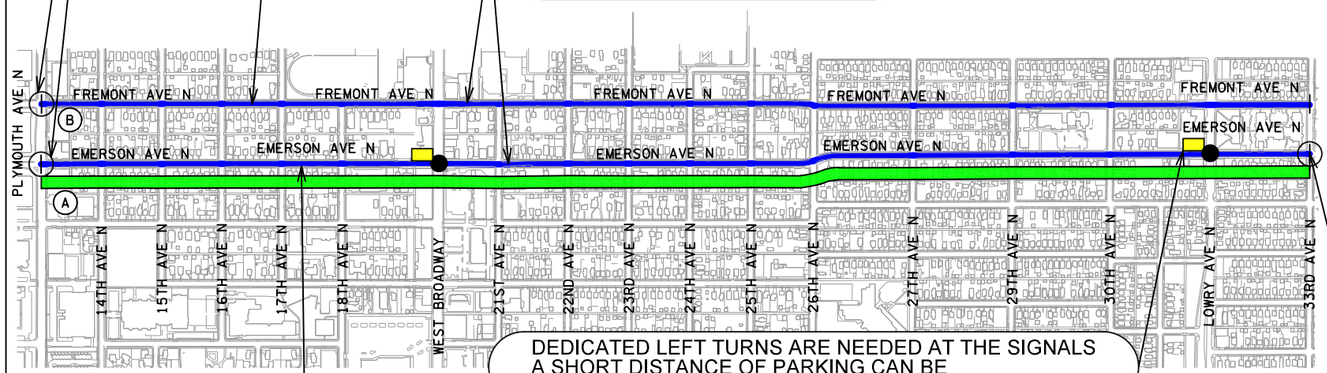
EMERSON/FREMONT AVE N - CONCEPT DESIGN 15

PROTECTED BIKE LANE CONNECTIONS REQUIRE FURTHER EVALUATION DURING PRELIMINARY ENGINEERING.

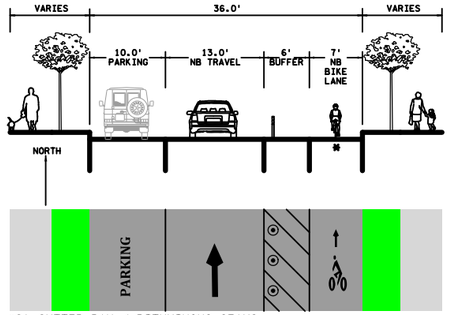
FREMONT AVE - EXISTING BUFFERED BIKE LANES
1. ADD DELINEATORS TO THE EXISTING BUFFER. (CONCEPT B1)
2. PROVIDING A PROTECTED BIKE LANE ON THE LEFT SIDE MAY PROVIDE BETTER COMPATIBILITY WITH FUTURE BRT BUS OPERATIONS. (CONCEPT B2)

FUTURE ARTERIAL BUS RAPID TRANSIT CORRIDORS
BUS STOP DESIGN AND SPACE REQUIREMENTS NEED TO BE CONSIDERED.



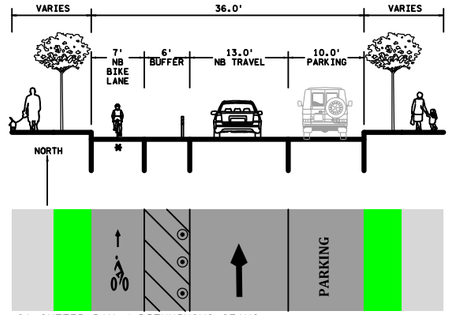
DEDICATED LEFT TURNS ARE NEEDED AT THE SIGNALS A SHORT DISTANCE OF PARKING CAN BE REMOVED TO CREATE A DE FACTO TURN LANE.

EMERSON AVE - A ONE-WAY PROTECTED BIKE FACILITY IS FEASIBLE.
ONE-WAY PROTECTED FACILITY CREATED BY REMOVING TRAVEL LANE. (CONCEPT A1)
CONSIDERATIONS:
1. A DESIGN EXCEPTION IS REQUIRED FOR 1-TRAVEL LANE ON A ONE-WAY STREET.
2. LONG TERM CONSIDERATION MAY INCLUDE PROVIDING A TWO-WAY BIKE FACILITY WITH BRT CORRIDOR. (CONCEPT A3)
3. PROVIDING A PROTECTED BIKE LANE ON THE LEFT SIDE MAY PROVIDE BETTER COMPATIBILITY WITH FUTURE BRT BUS OPERATION. (CONCEPT A2)
4. PROVIDE A SHORT DISTANCE OF PARKING REMOVAL IN APPROACH TO SIGNALIZED INTERSECTIONS TO ALL A DE FACTO TURN LANE OPERATION.



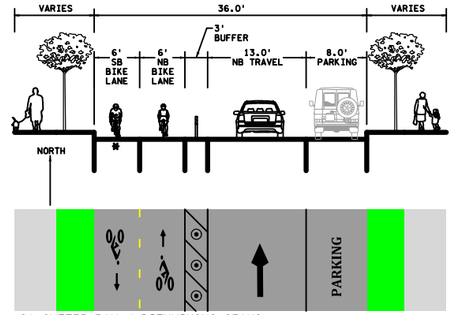
*2' GUTTER PAN / BITUMINOUS SEAMS

A1 EMERSON AVE N - PLYMOUTH AVE N TO 33RD AVE N
(NEAR TERM BIKE LANE)
-DESIGN EXCEPTION REQUIRED



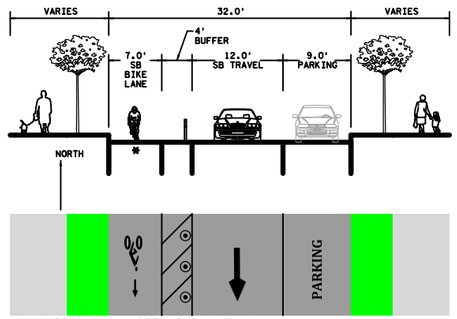
*2' GUTTER PAN / BITUMINOUS SEAMS

A2 EMERSON AVE N - PLYMOUTH AVE N TO 33RD AVE N
(LONG TERM CONSIDERATION WITH BRT)
-DESIGN EXCEPTION REQUIRED



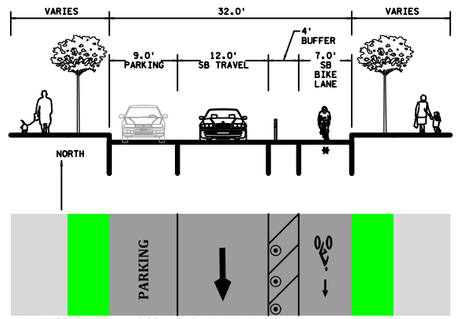
*2' GUTTER PAN / BITUMINOUS SEAMS

A3 EMERSON AVE N - PLYMOUTH AVE N TO 33RD AVE N
(LONG TERM CONSIDERATION WITH BRT)
-DESIGN EXCEPTION REQUIRED



*2' GUTTER PAN / BITUMINOUS SEAMS

B1 FREMONT AVE N - PLYMOUTH AVE N TO 33RD AVE N
-PREXISTING APPROVED DESIGN EXCEPTION REQUIRED



*2' GUTTER PAN / BITUMINOUS SEAMS

B2 FREMONT AVE N - PLYMOUTH AVE N TO 33RD AVE N
-PREXISTING APPROVED DESIGN EXCEPTION REQUIRED

CONNECTION TO EMERSON AVE BIKE BLVD AT 33RD AVE REQUIRES BICYCLIST TO BE ON THE RIGHT SIDE OF STREET TO ACCESS THE HALF CLOSER TO THE NORTH SIDE OF INTERSECTION.

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

N

0 300 1000
HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
EMERSON/FREMONT AVE N
PRELIMINARY CONCEPT
CORRIDOR 15

FIGURE A-15

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PLYMOUTH & 8TH AVE NE - CONCEPT DESIGN 16

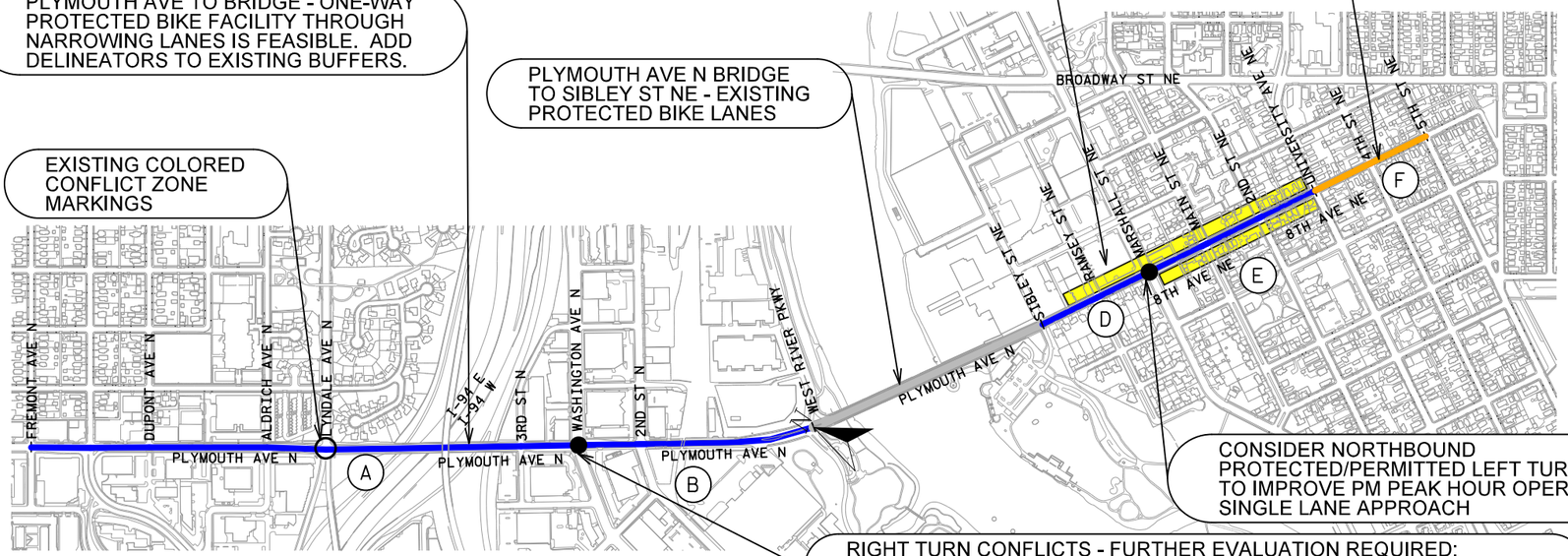
UNIVERSITY AVE NE TO 5TH ST NE - BIKE BOULEVARD
THIS SECTION HAS LOW ADT AND HIGH PARKING DEMAND

SIBLEY ST NE TO UNIVERSITY AVE NE - ONE-WAY PROTECTED BIKE FACILITY IS FEASIBLE.
CONSIDERATIONS:
1. PARKING REMOVAL IS REQURIED. CITY WILL INVESTIGATE FEASIBILITY.
2. PROVIDE A 6' INTERGRANT CURB BETWEEN 2ND ST AND UNIVERSITY AVE (36' WIDE BLOCK).

PLYMOUTH AVE TO BRIDGE - ONE-WAY PROTECTED BIKE FACILITY THROUGH NARROWING LANES IS FEASIBLE. ADD DELINEATORS TO EXISTING BUFFERS.

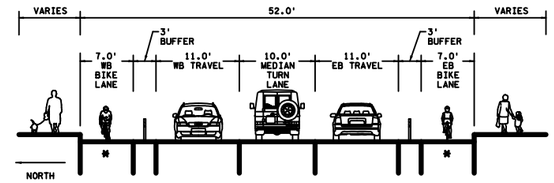
PLYMOUTH AVE N BRIDGE TO SIBLEY ST NE - EXISTING PROTECTED BIKE LANES

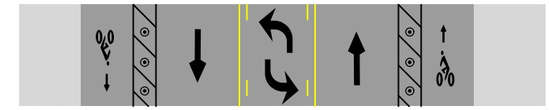
EXISTING COLORED CONFLICT ZONE MARKINGS



CONSIDER NORTHBOUND PROTECTED/PERMITTED LEFT TURN ARROW TO IMPROVE PM PEAK HOUR OPERATIONS IN SINGLE LANE APPROACH

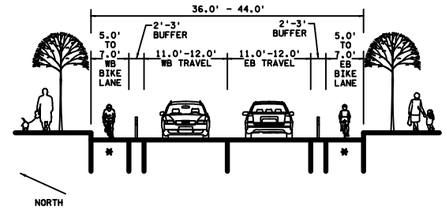
RIGHT TURN CONFLICTS - FURTHER EVALUATION REQUIRED:
1.MAINTAIN RIGHT TURN LANES AND ADD BUFFER TO BIKE LANE; OR
2.REMOVE RIGHT TURN LANES TO WIDEN BIKE LANE ALONG CURB

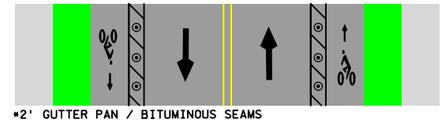




*SOME AREAS WITH 2' GUTTER PAN / BITUMINOUS SEAMS AND OTHER WITH BRIDGE DECK

(A) FREMONT AVE N TO WASHINGTON AVE N

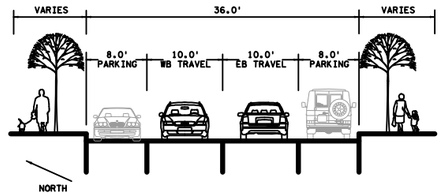




*2' GUTTER PAN / BITUMINOUS SEAMS

(B) (D) (E) WASHINGTON AVE N TO UNIVERSITY

BIKE/BUFFER WIDTH LESS THAN 10' IN SOME AREAS
B - (WASHINGTON AVE TO WEST RIVER PKWY) = 42'
D - (SIBLEY ST NE TO MARSHALL AVE NE) = 44'
E - (MARSHALL AVE NE TO 2ND ST NE) = 40'
E - (2ND ST NE TO UNIVERSITY AVE NE) = 36'



(F) UNIVERSITY AVE NE TO 5TH ST NE

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

N

0 500 1000
HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
PLYMOUTH & 8TH ST NE
PRELIMINARY CONCEPT
CORRIDOR 16

FIGURE A-16

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MAIN ST & MARSHALL AVE NE - CONCEPT DESIGN 17

MPRB EAST BANK TRAIL PROJECT IN DEVELOPMENT. THIS CONCEPT COULD PROVIDE ALTERNATIVE CONNECTIONS ACROSS BROADWAY ST NE.

1. CONSIDER WIDENING INTERSECTION (NW & SE CORNERS) TO PROVIDE RIGHT TURN LANE SPACE
2. RIGHT TURN MIXING ZONE AREA
3. CONFLICT ZONE PAVEMENT MARKINGS

14TH AVE NE TO LOWRY AVE NE- MAINTAIN EXISTING CONDITIONS. TWO OPTIONS REQUIRE FURTHER CONSIDERATION:

OPTION E1: TWO-WAY PROTECTED BIKE LANE ON WEST SIDE:
1. REMOVE PARKING ON WEST SIDE OF THE STREET
2. PARKING REMOVAL FEASIBILITY WILL HAVE TO BE FURTHER INVESTIGATED WITH CITY OFFICIALS AND STAKEHOLDERS.

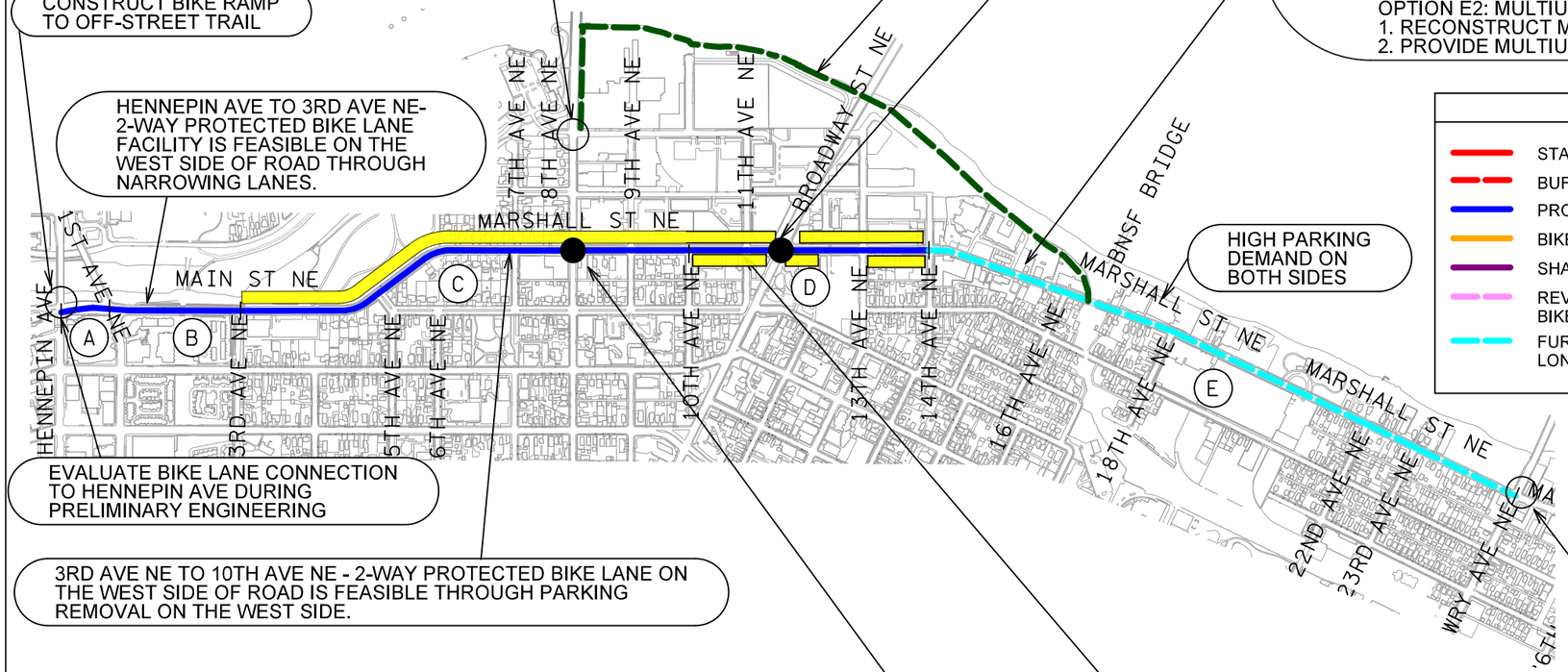
OPTION E2: MULTIUSE TRAIL:
1. RECONSTRUCT MARSHALL ST NE AND NARROW ROADWAY.
2. PROVIDE MULTIUSE TRAIL ON WEST SIDE OF THE STREET.

CONNECTION TO BOOM ISLAND TRAIL SYSTEM

CONSTRUCT BIKE RAMP TO OFF-STREET TRAIL

HENNEPIN AVE TO 3RD AVE NE- 2-WAY PROTECTED BIKE LANE FACILITY IS FEASIBLE ON THE WEST SIDE OF ROAD THROUGH NARROWING LANES.

HIGH PARKING DEMAND ON BOTH SIDES



EVALUATE BIKE LANE CONNECTION TO HENNEPIN AVE DURING PRELIMINARY ENGINEERING

3RD AVE NE TO 10TH AVE NE - 2-WAY PROTECTED BIKE LANE ON THE WEST SIDE OF ROAD IS FEASIBLE THROUGH PARKING REMOVAL ON THE WEST SIDE.

10TH AVE NE TO 14TH AVE NE- 2-WAY PROTECTE BIKE LANE ON THE WEST SIDE OF ROAD IS FEASIBLE. CONSIDERATIONS:
1.CONVERT MARSHALL ST NE TO A 3-LANE ROAD.
2. REMOVE PARKING ON BOTH SIDES OF MARSHALL ST NE.

HIGH VOLUME RIGHT TURN CONFLICTS. PROVIDE:
1. RIGHT TURN MIXING ZONE AREA
2. CONFLICT ZONE PAVEMENT MARKINGS
3. TURN BOX FOR CONNECTING TO 8TH AVE BIKE FACILITY

FURTHER STUDY IS REQUIRED TO DETERMINE OPPORTUNITY TO CONNECT TO ST. ANTHONY PARKWAY OR 27TH AVE NE

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

0 500 1000
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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
MAIN ST & MARSHALL AVE NE
PRELIMINARY CONCEPT
CORRIDOR 17

FIGURE A-17
1 OF 2

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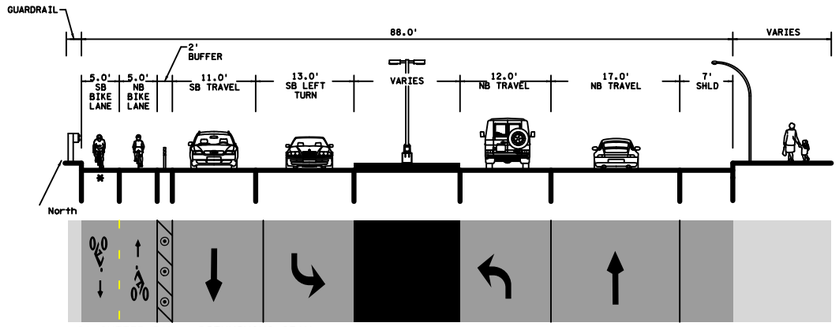
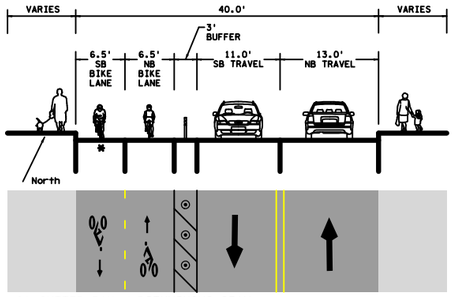
MAIN ST & MARSHALL AVE NE - CONCEPT DESIGN 17



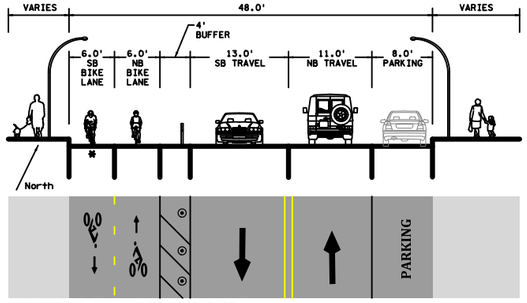
*2' GUTTER PAN / BITUMINOUS SEAM

(A) E HENNEPIN AVE TO 1ST AVE NE



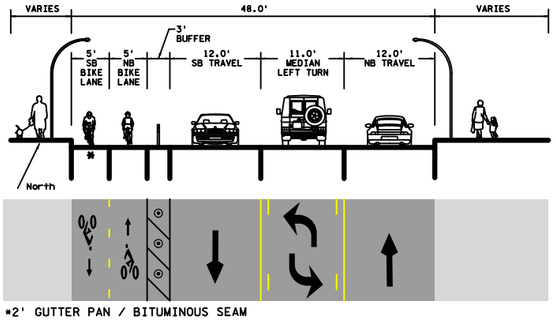
*2' GUTTER PAN / BITUMINOUS SEAM

(B) 1ST AVE NE TO 3RD AVE NE



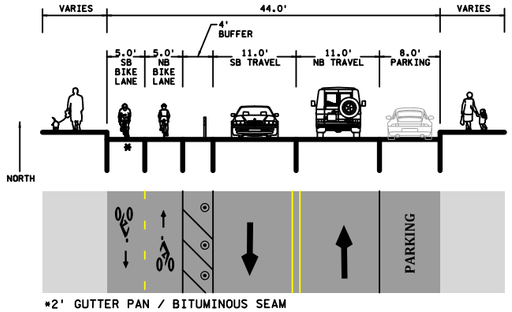
*2' GUTTER PAN / BITUMINOUS SEAM

(C) 3RD AVE NE TO 10TH AVE NE



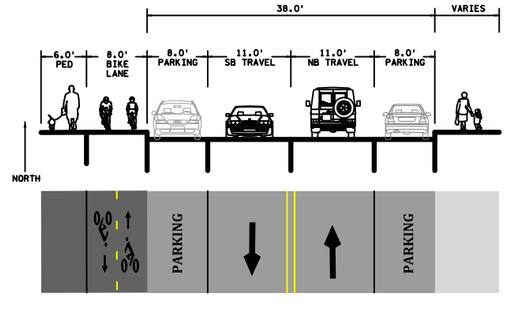
*2' GUTTER PAN / BITUMINOUS SEAM

(D) 10TH AVE NE TO 14TH AVE NE



*2' GUTTER PAN / BITUMINOUS SEAM

(E1) 14TH AVE NE TO LOWRY AVE NE



(E2) 14TH AVE NE TO LOWRY AVE NE

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
MAIN ST & MARSHALL AVE NE
PRELIMINARY CONCEPT
CORRIDOR 17

FIGURE A-17
2 OF 2

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3RD AVE/CENTRAL AVE - CONCEPT DESIGN 18

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

A TWO-WAY PROTECTED BIKE LANE MAY BE FEASIBLE BETWEEN 18TH ST AND 11 ST THOUGH THE REMOVAL OF A NORTHBOUND TRAVEL LANE NORTH OF I-94 AND REMOVAL OF A SECTION OF PARKING SOUTH OF I-94. HOWEVER FURTHER EVALUATION IS NECESSARY TO DETERMINE BIKE LANE FEASIBILITY TO THE NORTH AND SOUTH.

PROTECTED BIKE FACILITIES ARE NOT FEASIBLE BETWEEN 11TH ST S AND WASHINGTON AVE WITHIN EXISTING CURBS FURTHER EVALUATION OF BICYCLE ACCOMMODATION IS NECESSARY.

SEE CONCEPT 1C

ONE-WAY PROTECTED BIKE LANES BETWEEN WASHINGTON AVE AND 5TH ST NE THROUGH THE REMOVAL OF PARKING. FURTHER INVESTIGATION IN FEASIBILITY OF PARKING REMOVAL IS NEEDED.

REMOVE NORTHBOUND RIGHT TURN LANE AND RIGHT TURN ARROW

PROTECTED BIKE FACILITIES ARE LIKELY NOT FEASIBLE IN SEGMENT SOUTH OF 18TH ST. CONSIDERATIONS:
1. PARKING REMOVAL ON ONE SIDE OF THE STREET TO FIT PROTECTED OR STANDARD BIKE LANES; OR
2. STANDARD BIKE LANE IN ONE DIRECTION WITH A SHARED BIKE LANE IN THE OTHER; OR
3. SHARED LANE MARKINGS IN BOTH DIRECTIONS

2ND ST S TO 1ST ST S MAY REQUIRE DESIGN EXCEPTION FOR NARROW LANES AND STANDARD BIKE LANES IN THE CURB LANE MAY BE NECESSARY. (CONCEPT 2C) TWO POTENTIAL OPTIONS ARE BEING CONSIDERED AND REQUIRE FURTHER EVALUATION:

OPTION 2C1: MAINTAIN CENTER LEFT TURN LANE
1. A NARROW PROTECTED BIKE LANE IN THE SOUTHBOUND DIRECTION CAN BE PROVIDED. THE NORTHBOUND DIRECTION IS A STANDARD BIKE LANE.
2. PARKING REMOVAL IS REQUIRED. OFF PEAK PARKING IN SOUTHBOUND LANE IS FEASIBLE BUT MAY BE NOT DESIRED DUE TO NARROW BUFFER AND BIKE LANE WIDTH.
3. A DESIGN EXCEPTION IS REQUIRED.

OPTION 2C2: REMOVE LEFT TURN LANES
1. PROTECTED BIKE LANES CAN BE PROVIDED WITH THE REMOVAL OF THE CENTER LEFT TURN LANE.
2. PM PEAK PERIOD CAPACITY MAY BE PROBLEMATIC AT 1ST ST. FURTHER EVALUATION IS NEEDED.
3. A SOUTHBOUND PROTECTED/PERMISSIVE LEFT TURN ARROW AT 2ND ST WILL BE NECESSARY TO ACCOMMODATE AM PEAK PERIOD TRAFFIC FLOW.
4. PARKING REMOVAL IS REQUIRED. OFF PEAK PARKING MAY BE FEASIBLE IF SUFFICIENT LENGTH NO PARKING ZONES (~75') TO PROVIDE LEFT TURN AND RIGHT TURN BYPASS MOVEMENTS IS PROVIDED.

PROTECTED BIKE LANES COULD END AT UNIVERSITY AVE AND TRANSITION TO EXISTING SHARED LANE FACILITY NORTH OF UNIVERSITY AVE.

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

N

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HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
3RD AVE/CENTRAL AVE
PRELIMINARY CONCEPT
CORRIDOR 18

FIGURE A-18
1 OF 2

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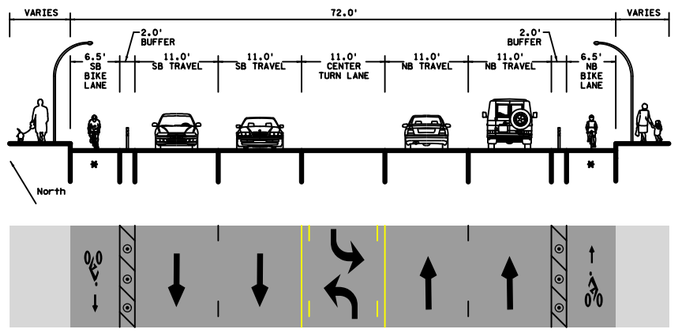
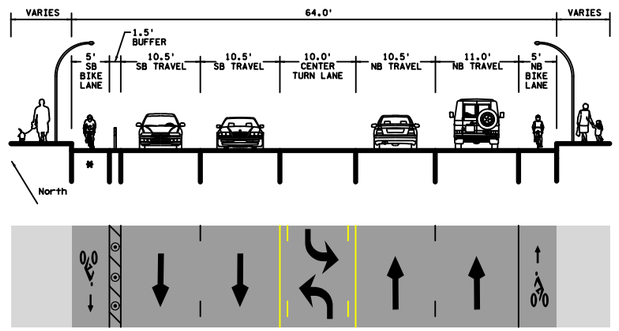
3RD AVE/CENTRAL AVE - CONCEPT DESIGN 18



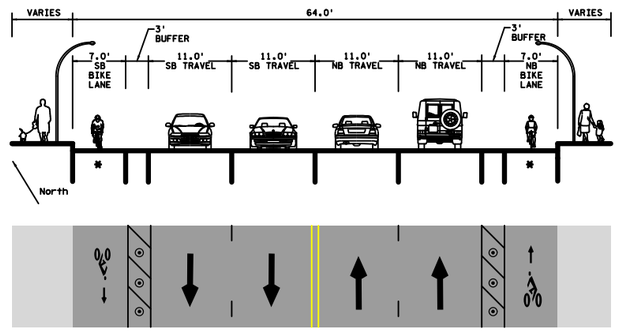
*BITUMINOUS OVERLAYS THE GUTTER

1C WASHINGTON AVE TO 2ND ST S
-BIKE/BUFFER WIDTH LESS THAN 10'



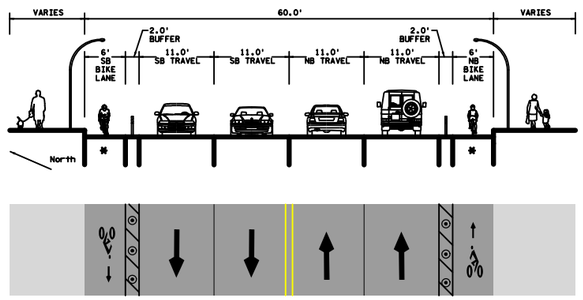
*BITUMINOUS OVERLAYS THE GUTTER

2C1 2ND ST S TO 1ST ST S
-BIKE/BUFFER WIDTH LESS THAN 10'
-DESIGN EXCEPTION REQUIRED



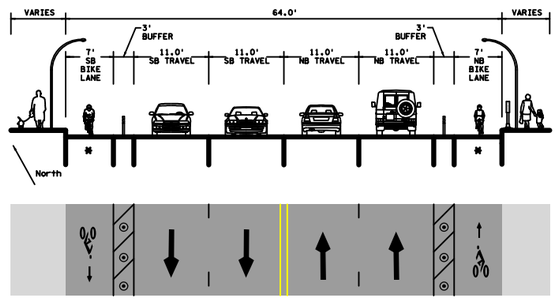
*BITUMINOUS OVERLAYS THE GUTTER

2C2 2ND ST S TO 1ST ST S



*CONCRETE BRIDGE DECK

D 1ST ST S TO 2ND ST NE
-BIKE/BUFFER WIDTH LESS THAN 10'



*2' GUTTER PAN / BITUMINOUS SEAMS

E 2ND ST SE TO 5TH ST SE

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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233 Park Ave S, Ste 300
Minneapolis, MN 55415
612.758.3080 MAIN
612.758.3099 FAX
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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
3RD AVE/CENTRAL AVE
PRELIMINARY CONCEPT
CORRIDOR 18

FIGURE A-18
2 OF 2

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WASHINGTON AVE S - CONCEPT DESIGN 19

PROVIDE RIGHT TURN LANE MIXING ZONES IN ADVANCE OF PORTLAND AVE, CHICAGO AVE, 11TH AVE AND I-35W TO ACCOMODATE RIGHT TURN VEHICLE MOVEMENTS.

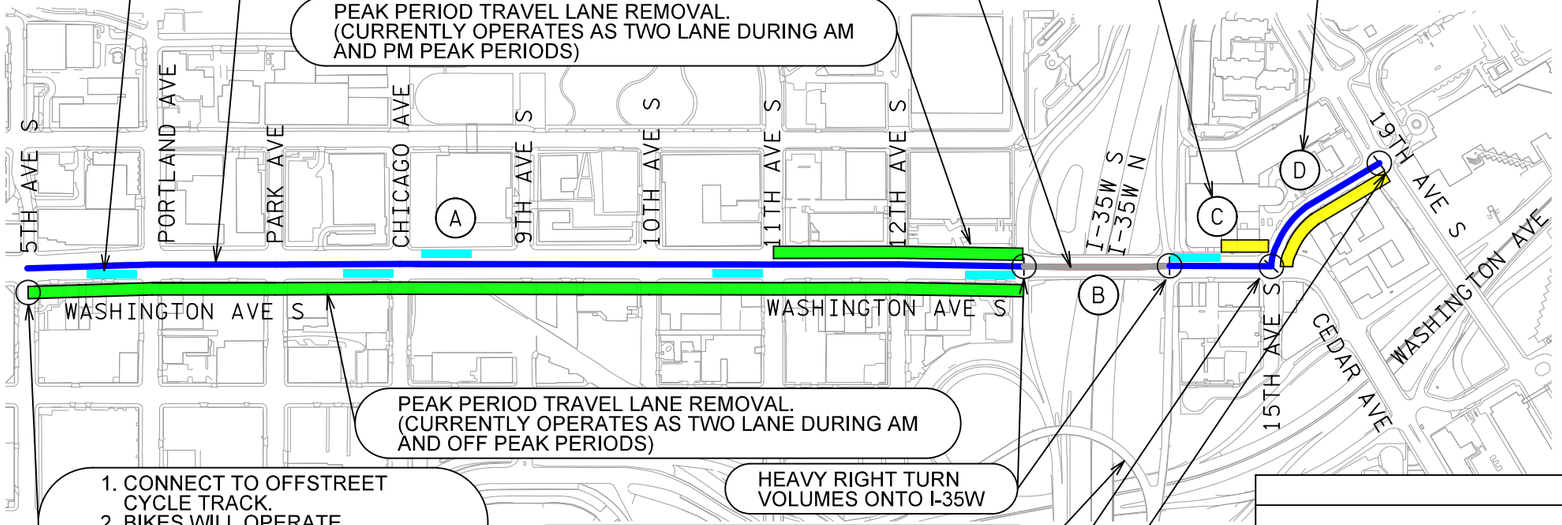
5TH AVE TO I-35W - FOR INTERIM CONDITIONS (UNTIL THE WASHINGTON AVE VISION CAN BE CONSTRUCTED) - ONE-WAY PROTECTED BIKE LANES IS FEASIBLE THROUGH NARROWING OF LANES AND THE REMOVAL OF THE PEAK PERIOD RIGHT TRAVEL LANE IN EACH DIRECTION.
CONSIDERATION:
1. THE PEAK PERIOD LANE REMOVAL IS NOT FEASIBLE UNTIL THE 4TH ST ON RAMP PROJECT IS COMPLETED.
2. RIGHT TURN MIXING ZONES ARE REQUIRED AT PORTLAND AVE, CHICAGO AVE, 11TH AVE, AND BOTH 35W RAMPS.
3. THE LONG TERM VISION FOR WASHINGTON AVE IS AN OFF-STREET CYCLE TRACK. CONCEPTS ARE NOT SHOWN IN THIS DOCUMENT.
4. BIKES WILL OPERATE WITH CONCURRENT VEHICLE PHASE. BIKE SIGNALS ARE NOT PROVIDED.

I-35W TO 15TH AVE - ONE-WAY PROTECTED BIKE FACILITY WITH REMOVAL OF PARKING ON THE NORTH SIDE IS FEASIBLE. IF PARKING REMOVAL IS NOT FEASIBLE, THEN PROVIDE A BUFFERED BIKE LANE ON THE NORTH SIDE.

15TH AVE TO 19 AVE - ONE-WAY PROTECTED BIKE FACILITY IS FEASIBLE WITH REMOVAL OF PARKING ON ONE SIDE.

MAINTAIN STANDARD BIKE LANES ON I-35W BRIDGE. PROVIDE PROTECTED BIKE LANES WHEN THE BRIDGE DECK IS REPLACED.

PEAK PERIOD TRAVEL LANE REMOVAL.
(CURRENTLY OPERATES AS TWO LANE DURING AM AND PM PEAK PERIODS)



PEAK PERIOD TRAVEL LANE REMOVAL.
(CURRENTLY OPERATES AS TWO LANE DURING AM AND OFF PEAK PERIODS)

1. CONNECT TO OFFSTREET CYCLE TRACK.
2. BIKES WILL OPERATE CONCURRENT WITH ADJACENT VEHICLES SIGNAL.

HEAVY RIGHT TURN VOLUMES ONTO I-35W

NEW 4TH STREET RAMP TO NB I-35W CONSTRUCTION WILL BE COMPLETE IN 2015.

PROVIDE TWO STAGE TURN BOX AND CONFLICT ZONE MARKINGS

PROTECTED BIKE LANE CONNECTION TO 19TH AVE REQUIRES FURTHER EVALUATION DURING PRELIMINARY ENGINEERING.

LEGEND

- STANDARD BIKE LANE
- BUFFERED BIKE LANE
- PROTECTED BIKE LANE
- BIKE BOULEVARD
- SHARED BIKE LANE
- REVIEW ALTERNATIVE ROUTE OR BIKEWAY TYPE OPTIONS
- FURTHER EVALUATION OF LONGER-TERM OPTIONS REQUIRED
- OFF-STREET TRAIL
- FUTURE OFF-STREET TRAIL
- EXISTING BIKE LANE
- SPECIAL INTERSECTION TREATMENT MAY BE NEEDED
- DELINEATOR
- PARKING REMOVAL
- TRAVEL LANE REMOVAL
- ADD PARKING

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

N

0 250 500
HORIZONTAL SCALE IN FEET
SCALE 1000

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
WASHINGTON AVE S
PRELIMINARY CONCEPT
CORRIDOR 19

FIGURE A-19
1 OF 2

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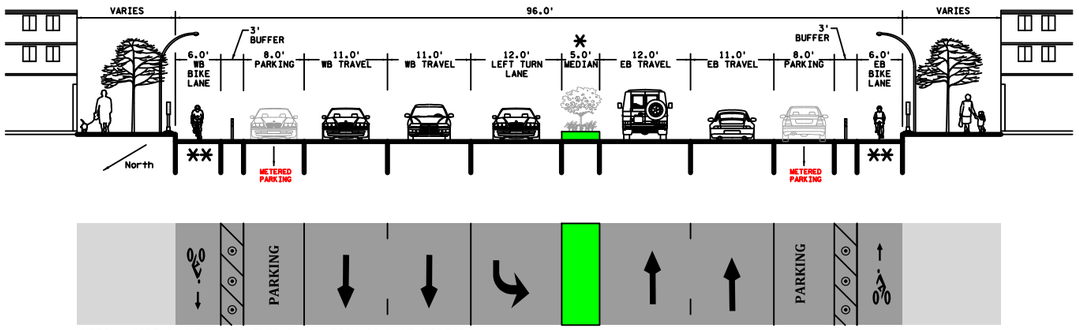
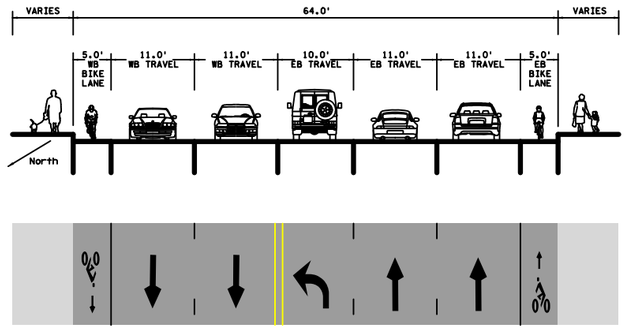
WASHINGTON AVE S - CONCEPT DESIGN 19

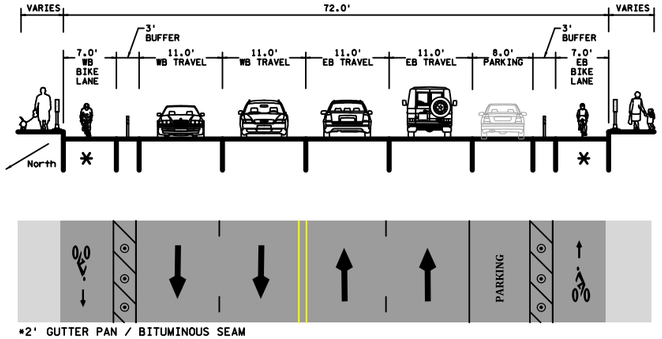


*MEDIAN WIDTHS VARY - FURTHER EVALUATION OF LANE WIDTHS AND STRIPING IS NECESSARY DURING PRELIMINARY ENGINEERING
**2' GUTTER PAN / BITUMINOUS SEAM

(A) 5TH AVE S TO I-35W BRIDGE
-BIKE/BUFFER WIDTH LESS THAN 10'

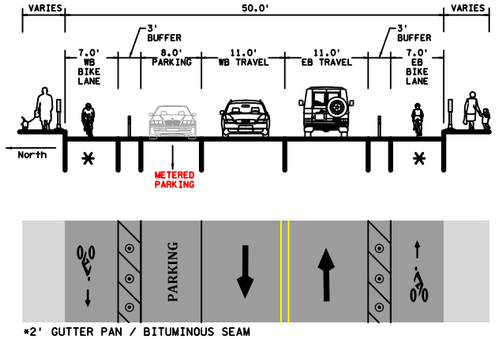


(B) I-35W BRIDGE



*2' GUTTER PAN / BITUMINOUS SEAM

(C) I-35W BRIDGE TO 15TH AVE (PARKING REMOVAL SHOWN)



*2' GUTTER PAN / BITUMINOUS SEAM

(D) 15TH AVE TO 19TH AVE

NOTE:

1. PRELIMINARY CONCEPT FOR PURPOSES OF DETERMINING THE FEASIBILITY OF PROTECTED BIKEWAY IMPLEMENTATION. WIDTHS ARE APPROXIMATE. CONCEPTS WILL BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

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PROTECTED BIKEWAYS FEASIBILITY ANALYSIS
WASHINGTON AVE S
PRELIMINARY CONCEPT
CORRIDOR 19

FIGURE A-19
2 OF 2

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